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AUTHOR Lecht, Leonard A.; And Others
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ABSTRACT

This plan, which uses current and projected manpower and demographic information to define vocational education programs, objectives, and priorities, is designed to help the program planner collect and combine information about his students, programs, and the labor market. Planning steps are: (1) identify population served, (2) relate current enrollment to population, (3) set enrollment objectives, (4) identify occupational patterns and derive job openings, (5) relate program completion to job openings, (6) set completion objectives, (7) translate completions to enrollments, (8) match enrollment objectives by type of program and occupational area, and (9) estimate resources required for achieving each program objective. Guidelines are provided for establishing an information base in terms of demographic projections (Steps 1-3), for developing labor market information in order to estimate completion objectives (Steps 4-7), and for adjusting the two sets of objectives so that projected occupational, special education, and cooperative programs are approximately matched to the needs of the anticipated student population (Steps 8 and 9). Additional guidelines for coordinating state and local vocational education plans are appended. (SB)

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RELATING MANPOWER AND DEMOGRAPHIC INFORMATION TO PLANNING VOCATIONAL-TECHNICAL EDUCATION

Leonard A. Lecht
John B. Teeple
Maria-Aurora Paredes

Center for Priority Analysis
National Planning Association
1250 Connecticut Avenue, Room 333
Washington, D.C. 20036

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BACKGROUND INFORMATION

This publication is the result of a continuing research program by the Center of Priority Analysis in the National Planning Association. It results from previous work which related National Goals and their costs to manpower and vocational education priorities in the 1970's.

These guidelines have been prepared to assist local vocational education planners in utilizing manpower and demographic information in setting enrollment objectives for their local programs. The guide presents a tool to help the local administrator anticipate future needs and assign priorities to specific programs in order to effectively allocate resources. A local plan is a result of these decisions, and this guide should not be interpreted as a substitute format for a completed local plan. Rather it suggests how information describing present and anticipated future labor market and population trends can be related to educational variables so that decisions about programs can be quantitatively expressed in terms of need.

There are many variables in planning educational programs besides those treated in this guide such as sex differences, dropout and student performance levels. They will also affect the types of decisions made concerning program priorities. Concentration in this document on general manpower and demographic measures reflects the concerns of the Amendments of 1968 in relating programs to job opportunity and to students. Once these basic types of information have been structured and related to educational enrollments and completions, the effect of these other variables can be assessed. This guide therefore provides the basic framework for vocational education planning, a framework which will allow the administrator to assess the implication of his program decisions, to seek alternative program mixes to achieve his objectives and to evaluate the effects of changes in resources on his output--providing students with marketable skills.

Since the development of a final planning guide will require feedback from those responsible for vocational education planning, the Office of Education and the authors would appreciate receiving their comments.

The authors wish to thank their fellow-workers, Nancy Monroe and Sheila O'Donnell who contribute valuable editorial and typing assistance in the preparation of this report.

NATIONAL PLANNING ASSOCIATION
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PART I

Chapter 1

PLANNING IN VOCATIONAL EDUCATION

The Vocational Education Amendments of 1968 require the educator to develop, and update annually, a plan for a five-year period setting out his objectives in measurable terms and determining the resources needed to achieve these objectives. The educator may set an objective of providing vocational skills to a larger number of students, or of training for different occupations or he may wish to serve more disadvantaged and handicapped students than in the past. It is no easy task to achieve such objectives with a restricted budget in a dynamic society in which a rapidly changing technology is shifting job opportunities and a highly mobile population is constantly changing numbers and characteristics of students. The purpose of this handbook is to show how manpower and demographic data can help the vocational educator in this task.

Manpower data that show growing and diminishing occupational categories and demographic projections that show shifts in student populations are critical to realistic planning. So are many other factors such as the teachers, facilities, and expected budgets. While the focus of the handbook is on techniques for using manpower and demographic data, it is first necessary to see how this information relates to the overall planning process.

The Uses and Limits of Planning

Over the last few years planning has been oversold and made overly complicated. Many scholarly papers were written on strategic planning versus tactical planning versus long-range planning--on PPBS--and on computer simulations. Flow charts and cost-benefit formulas began to be viewed as ends in themselves. What got lost in all of this was the basic notion that planning is a straightforward concept having very similar elements and implications whether used by an individual or a large organization. People and institutions plan in order to help them decide how best to use limited resources in achieving their objectives. But planning never substitutes for good judgement.

We shall develop these points in more detail as they are basic to the approach used in this handbook. They involve a number of considerations, such as:

1. Planning is a straightforward concept.
2. Planning stresses the development of realistic, quantified objectives; however, planning does not determine objectives, people do.
3. Planning is not a substitute for good judgement.
4. Information is a key element in planning.
5. Planning is useful to the educator insofar as it helps him determine how to use resources to achieve more of his objectives.

The plan becomes a major asset when it helps the vocational educator to lay out future steps (e.g., courses to cut back or add, teacher talents needed), and to keep his priorities clear.

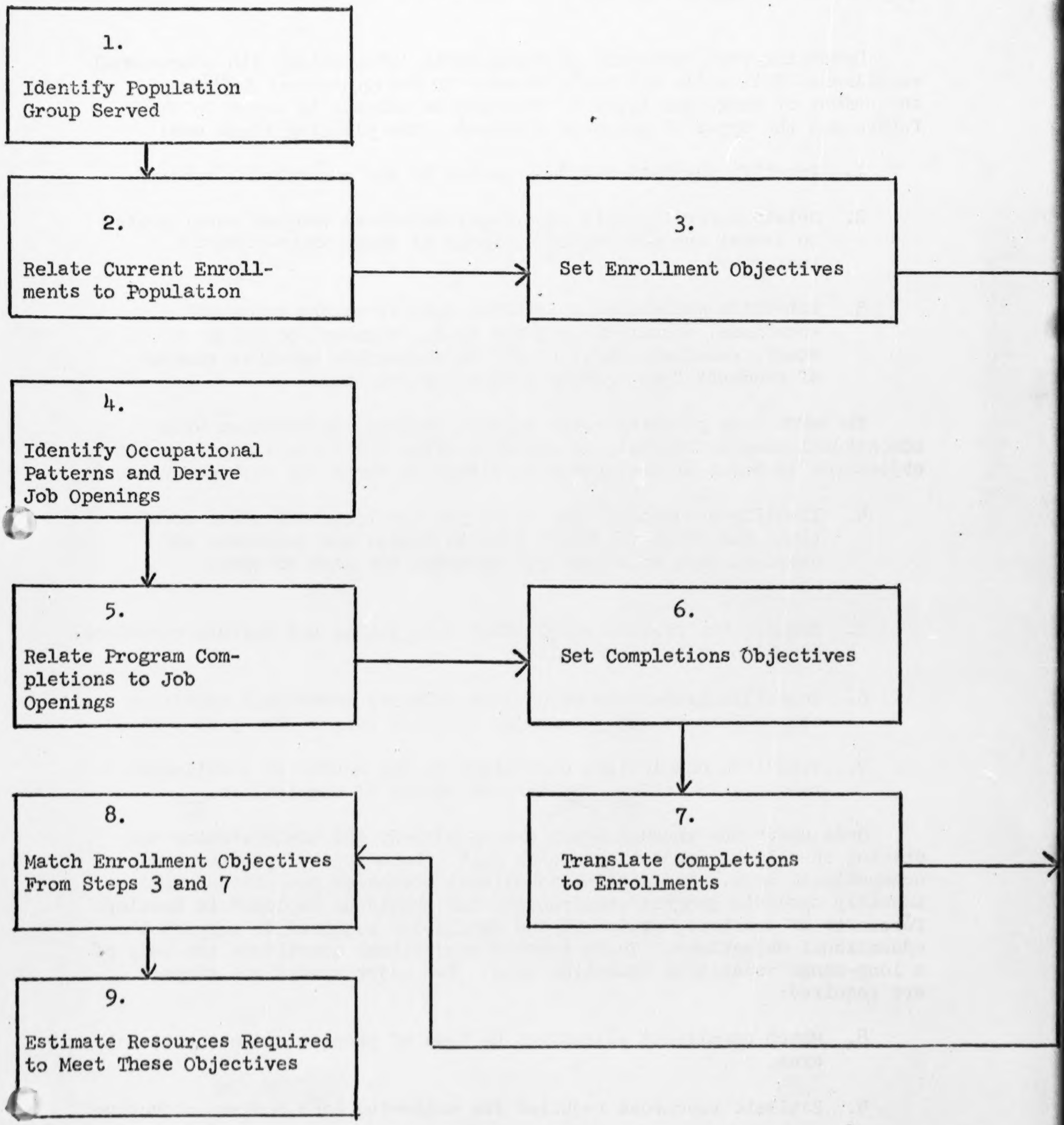
Demographic and Manpower Aspects of Vocational Education Planning

The remainder of this handbook will discuss in detail how manpower and demographic data can be used to establish realistic objectives. One of the major purposes of this document is to show the planner how to collect and combine diverse information about his students, his programs and the labor market so he can plan future programs which better meet the occupational and educational needs of his students. These kinds of information will allow him to set realistic program objectives for future years.

Developing a long-range vocational education program sensitive to labor market needs is, of necessity, a step-by-step process. However, just as in taking a trip, it's good to know where you are going before you start. Prior to defining these planning steps, therefore, we suggest that the vocational planner review the planning approach presented in Figure 1 on the following page. This figure illustrates one approach to combining socio-economic, educational, and labor market data in developing a plan. While this approach is not indispensible, it illustrates the relation between different types of information normally requested in a planning document.

FIGURE 1.

Relation Between Major Steps in Using Manpower and Demographic Information in Planning


1. Identify Population Group Served
2. Relate Current Enrollments to Population
3. Set Enrollment Objectives
4. Identify Occupational Patterns and Derive Job Openings
5. Relate Program Completions to Job Openings
6. Set Completions Objectives
7. Translate Completions to Enrollments
8. Match Enrollment Objectives From Steps 3 and 7
9. Estimate Resources Required to Meet These Objectives

The steps involved in using current and projected manpower and demographic information to define educational programs and priorities for the future are listed below. The first three steps describe the use of demographic information in setting objectives in terms of enrollments by target population and type of program.

Comparing socio-economic or demographic information with educational enrollments will allow the administrator to set objectives defining the number of different types of students he intends to serve in the future and the types of programs required. The planning steps are:

1. Identify population groups served by the educational system;

2. Relate current public vocational-technical program enrollments to school age population in terms of these socio-economic indicators;

3. Establish measurable objectives specifying the types of vocational education programs (i.e., regular, co-op, work study, remedial, etc.) needed to accomodate specific numbers of students from various target populations.

The next four planning steps compare manpower information with educational program completions and will allow the administrator to set objectives in terms of the number he wishes to train for each occupation.

4. Identify occupations for which you now train and other occupations for which you would like to train, and translate employment data to annual job openings for each of these occupations;

5. Compare the program completions from public and private vocational education with job openings;

6. Establish measurable objectives relating vocational education completions to changes in job openings over a five year period;

7. Translate completions objectives to the number of enrollments required to achieve the desired number of completions.

Once steps one through seven are completed, the administrator can develop enrollment projections which relate both type of program and occupational area. These total vocational education projections will identify specific program requirements and should be employed to develop forecasts of teachers, equipment, and facilities required to support the educational objectives. These summary projections constitute the body of a long-range vocational education plan. Two major analytical steps are required:

8. Match enrollment objectives by type of program and occupational area.

9. Estimate resources required for achieving each program objective.

Establishing an information base in terms of demographic projections is the first task in planning occupational education programs (Steps 1-3). The following chapter illustrates how to organize this information to make it a framework for planning. Chapter 3 deals specifically with the development of labor market information in order to estimate completion objectives (Steps 4-7). Chapter 4 describes the process of adjusting these two sets of objectives so that projected occupational, special education and cooperative programs are appropriately matched to the needs of the anticipated student population (Steps 8 and 9).

Chapter 2

STEPS IN USING DEMOGRAPHIC INFORMATION TO DEVELOP ENROLLMENT OBJECTIVES

One of the primary purposes of vocational education is to serve non-college-bound students needing occupational skills. The planner will therefore first want to obtain a thorough description of the population by race, socio-economic characteristics, or physical handicap. Moreover, he must have some feel for the shifting focus of various subpopulations as this will affect the schools in his district.

Before describing the step-by-step analytic process for treating demographic and educational data in developing enrollment objectives, it is worthwhile to review the kinds of information which will be employed. (Chapter 5 discusses some of the common sources of this information.)

Two major purposes for collecting information on students by target population is that different kinds of students need different types of education programs and different kinds of teachers. While there are many ways in which a population can be subdivided, data is not always available. The educator should at least seek out data on the white, non-white, disadvantaged and handicapped sectors of the school district's population and estimates of changes in the size of these sectors over the next five years. These breakdowns should be obtained for enrollments and for school-age population.

Enrollments. The net enrollment in vocational education programs defines the number of different students currently being served by vocational education.

The educational administrator, however, will have to define what constitutes a vocational education enrollee. Certainly all students in occupational programs in-post secondary and specialized secondary vocational schools will be included. However, in comprehensive high schools a student may take vocational courses in one grade and switch to a general course the next or take a course without intending to be a regular vocational education student. A judgement is required which predicts how many 9th through 11th grade students taking coursework in an occupational area with instructional program code are terminal occupational education students.

When calculating vocational education enrollments the educator should obtain a breakdown by instructional program and target population. With such information he will be able to relate enrollment information to the size of the school age target populations in his community. (See Chapter 5).

Most of the raw data on enrollments is already available within the education agency. In cases where it is not, it can be collected on an annual or semi-annual basis without too much difficulty.

School Age Population. To assess the degree to which the vocational school programs are serving the educational needs of the community, it is necessary to determine the size of the school age population in the area served by the local education agency and the characteristics of this population in terms of racial groups, socio-economic characteristics, and physical handicaps. Socio-economic data describing the current and anticipated size of various target populations may be difficult to obtain in some cases.

Generally, information is available in the census for both metropolitan areas and states. Usually a population breakdown for families with annual incomes under $3,000 will be available. Information on characteristics in the census, however, may refer to total population although age-breakdowns are available in some cases.

In addition to benchmark data the educator needs to know the current and projected population of the 15-19 year and 20-24 year age groups (standard census population categories). Chapter 5 discusses sources of such data. While anticipated changes in the size of the school age population of the city are the best yardstick for projecting future school enrollments, it is possible to make a preliminary estimate of enrollments from educational data alone. In cities with little in or no out migration an estimate of the net potential total enrollment in grades 8-12 five years from now is the current total enrollment in grades 3-7, disregarding dropouts or transfers to or from non-public schools. The percentage of dropouts and net transfers out of secondary schools should then be calculated and subtracted from the initial estimated projection.

Other Demographic Variables. There are several national trends in population change which must be considered by the educator in interpreting local population statistics and projections and estimating their effect on future program enrollments. These include trends in nonwhite population and employment, the effect of population migration, the decentralization of cities and the role of increasing educational attainment of labor force participants.

Nonwhite Population and Employment. While some interpret federal laws as forbidding the collection of social statistics on the basis of race, it is nonetheless known that population growth among nonwhites has been rapid in the school age groups near to entering the labor force. From 1960 to 1966, the nonwhite population under 14 grew by 16 percent.(1) In the next twenty years, it is estimated that the growth rate in the school age population among nonwhites will continue to be high, nearly double the comparable rate for whites.

Information on age and employment status by race is also available. Data show, for example, that in 1967 one out of every four nonwhite teenagers was unemployed. The slum unemployment rate was even higher. If the number of unemployed nonwhite teenagers persists at current levels or increases in the next decade, further pressures will develop for special vocational training efforts to meet their needs.

Migration. Vocational education enrollment changes due to migration must be considered in planning in addition to those due to current local population needs. Population growth based on the in-migration of families has different effects on education than population changes resulting from elementary and junior high school students reaching high school age. A time lag in the demand for housing, education, and services occurs in connection with population increase due to the birth of children and aging of the population. In contrast, the migration of entire families imposes immediate demands on the new community for work, education, housing and services. In the decade ahead, educational systems of some cities, particularly in the southwest, will be challenged by substantial increases in the need for their services resulting from migration. In these areas, the size of the future school age population and the special needs of these students will be less predictable than in the past. The administrator should discover if the population projections he is employing are based solely on birthrates or take into account the estimated influence and effects of migration.

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(1) Lecht, Leonard A., Manpower Needs for National Goals in the 1970's, Frederick Praeger, Inc., New York, 1969, p. 43.

Educational Attainment. As the supply of better-educated persons increases, their availability affects entrance requirements for jobs. The college degree has already replaced the high school diploma as an entry level requirement for many white collar occupations. Graduation from high school is now a prerequisite for most jobs dealing with the public and is frequently required for apprenticeship in skilled trades. As educational attainment rises generally, post-secondary occupational training will increasingly become a minimum requirement for jobs requiring formal skill preparation. Rising educational attainment and increased emphasis on educational credentials for a growing number of employment opportunities suggests increased emphasis on post-secondary occupational education.

Once the planner has selected sources of demographic information and educational data, he is ready to begin the analysis which will provide the administrator with information required to set enrollment objectives. Figure 2 summarizes and relates the three planning steps and associated analytical tasks.

FIGURE 2

STEPS RELATING DEMOGRAPHIC INFORMATION TO ENROLLMENT OBJECTIVES

PLANNING STEPS	ANALYSIS TASK	TEXT TABLE
1. Identify Population Groups	Determine current and projected changes in the size of the school aged population and various sub-populations	Table 1
2. Relate to Current Enrollments	Calculate Percent of Age Group Served for Each Subpopulation	Table 2
3. Set Objectives by Population Group and Type Program	Project Number of Enrollees by Subpopulation	Table 3
	Project Number of Enrollees by Type of Program	Table 3A

1. Identify Population Groups to be Served by Vocational Education

The first step is to find and record the estimated changes in total city school age population and its pertinent subgroups. This and subsequent steps will be illustrated in working tables using actual data from a U. S. city with a total population of 1 million. Table 1 presents a comparison of this school age population with the total population over a five-year period and indicates that while a majority of the city's 1970 population is white, nearly sixty percent or 46,000 school aged youths are nonwhite. Moreover, sixteen thousand youths come from poor families. The challenge to the city's vocational education program arising from the need to serve the disadvantaged is obvious.

TABLE 1

CURRENT AND PROJECTED SCHOOL AGED POPULATION IN AN URBAN AREA
(in 000's)

	Current Population 1970	Projected Populations 1975	Percent Change 1970-1975
TOTAL	929	928	-1
Age 20-24, white, nonwhite	74	76	+3
Secondary School Age Total (15-19)	81	83	+ 2
White	35	30	-14
Nonwhite	46	53	+15
Disadvantaged	16	14	-12
Handicapped	6	7	+17

The size of the population age group 15-19 indicates the potential "market" or need for secondary education, partly vocational. An increased number of 15 to 19 year olds by 1975 suggests a need for expanding secondary and post-secondary programs. A fifteen percent increase in the number of non-whites in the high school age population presents vocational educators with special problems. In the first place, non-white students may have occupational aspirations not well related to current program offerings or to the realities of the labor market. They may in some instances learn more quickly with non-white teachers, or approach occupational education in a manner different from that of whites. Their higher average dropout and youth unemployment rates suggest that vocational education has room to improve as well as expand educational services for this group. Similarly, projections of the numbers of handicapped persons and low-income families with dependent children may suggest a need for more tailoring of vocational programs to the learning needs of these particular groups.

2. Relate Current Public Educational Program Enrollments to School Age Population in Terms of These Socio-Economic Characteristics

Once the administrator has described the current and projected school-age population to be served, he must develop relationships between this population and current educational enrollments. These relationships will show the proportion of the school age population now enrolled and indicate how this varies for various target groups. Such an analysis may indicate where improvements in the delivery of educational services can be made.

It is common to find that there are no current data available on non-whites, the disadvantaged or the handicapped vocational enrollments. In this case, the planner must estimate this figure based on whatever information is available including his knowledge of the local school system. In our example, for instance, the planner has assumed that nonwhites are represented in vocational programs in the same proportion as in total secondary enrollments. He can therefore estimate that there were about 36,000 nonwhites enrolled in 1970 in secondary education programs (see Table 2).

A comparison of enrollments in the sample school system with the population being served is presented in Table 2. Overall, about three out of four secondary school-age children are enrolled in public high schools. Of the total white school age population, only two out of three are enrolled in public schools -- a lower proportion than for nonwhites. The lower percentage reported for whites is probably due to the numbers of white children enrolled in parochial and other private schools.

However, while nearly three out of four high school age children are served by current public educational programs, about 40% of the disabled with limited activity are served and only one in four of the disadvantaged group, defined by economic level of family, are enrolled. The low percentage of these populations in school is probably due to higher dropout rates for lower income students. In recognition of the fact that these groups are most in need of vocational skills, all students from these populations have been enrolled in vocational education programs.

In the current city example, dropout and follow-up data by target population was not available. This data should be collected. Measures of vocational program effectiveness would then include not only percent population by age group enrolled, but the percent of the enrollees completing training and the percent entering the field for which trained. Even with the limited data reported, it is possible to suggest some objectives in terms of vocational education enrollments.

Table 2

Target Population and Secondary Enrollments in an Urban Area in 1970 (numbers in thousands)

Population Component Aged 15-19	Number in City in 1970	Number Enrolled in Public Secondary Schools in 1970	Percent of Population Component in Public Secondary Schools in 1970	Percent of Population in Gainful Vocational Education
Total	81	58	72%	18%
White	35	22	63	17
Nonwhite	46	36	78	20
Disadvantaged (family income under $3,000)	16	4	25	25
Handicapped (limited activity)	6	2.5	42	42

3. Set Enrollment Objectives by Population Group and Type of Program

To detail target enrollment projections, the administrator must first estimate what proportion of total public secondary enrollments will be in vocational education. Enrollment projections for the five grades 8-12 have been used as a base.

A two percent increase in the population aged 15-19 has been projected for the city from 1970 to 1975. If enrollments in public secondary schools are the same percent of the total in this age group in 1975 as they were in 1970, the city's secondary schools will be enrolling about 60 thousand students in 1975.

Total secondary enrollment in public schools in 1970 was 58 thousand, and 15 thousand or 26% of these were in gainful occupational education programs (21 thousand additional were in Consumer and Homemaking Education).

The high youth unemployment rate in this city suggests that a greater proportion of the youth should learn marketable skills before leaving school. If our objectives were to increase gainful occupational program enrollments from 26% to 30% of total secondary enrollment, enrollments in these programs would increase from 15,000 to 18,000, a 20% increase from 1970 to 1975. Consumer and homemaking education enrollments are projected to increase only at the rate of overall secondary enrollments. See Table 3.

The proper way to set objectives is by establishing target enrollments for each type of program required to service the needs of student populations. Such objectives may be expressed either as a percent of total vocational education enrollments in 1975 or as a percentage enrollment increase over the five-year period. Projected enrollments by selected type of program and student population characteristics are illustrated for the sample city in Table 3A.

Some of these students will be full time, others part time (in cooperative, work study, or evening programs.) To make educational programs relevant to changes in the job market as well as target population needs, the planner may relate the part-time enrollments to the needs of disadvantaged youth. For economic reasons alone these students would profit from, and probably need, work after age 16. An objective by 1975, therefore, is to have half of the disadvantaged youth in the city enrolled in part-time vocational programs which allow them to be employed. Total enrollments are therefore projected to include spaces for 3,500 part-time students and the balance, between 14 and 15 thousand, for full-time students.

Projections of enrollments by target population (regardless of type of program) should be related to changes in the target populations as a proportion of the total population. Enrollments for some groups may increase faster than others in the five year period if they are underrepresented in current enrollments. The goal should be to give all types of students an equal opportunity to enroll and benefit from appropriate vocational training. Nonwhites in the school aged population will grow at a somewhat faster rate than the 14% increase projected for the total nonwhite population from 1970 to 1975. It is anticipated, with these objectives, that about two-thirds of public secondary school enrollments will be non-white within five years. If nonwhites are represented in vocational education in the same proportion as in total secondary enrollments, there will be about 12 thousand nonwhites enrolled in gainful secondary vocational technical education programs by 1975.

Table 3

Objectives for Vocational Education
Enrollments in an Urban area 1970-1975
(Numbers in Thousands)

	Actual Population 15-19 and Voc Ed Enrollment Figures For 1970		Projected Population 15-19 and Voc Ed Enrollments for 1975		Rationale for Enrollment Projection for 1970-1975
	Population	Enrollment	Population	Enrollment	
Total Secondary	81	58	83	60	
Total Voc Ed Secondary	81	36	83	37	
Gainful Voc Ed	81	15	83	18	Thirty percent of secondary enrollment in Voc. Ed.
White	35	6	30	6	Declining population but increasing proportion in Voc. Ed.
Nonwhite	46	9	53	12	An increase from 62 to 67% enrollments in five years
Disadvantaged	16	4	14	7	Increase from 25 to 50% of teenage population in Voc Ed.
Handicapped	6	2.5	7	3.5	Increase from 42 to 50% of population in Voc. Ed.

Table 3 A

Enrollment Objectives by Type
of Program in an Urban Area, 1970-1975

Target Populations	Actual 1970					Projected 1975				
	Reg.	Co-op	Work Study	Spec. Ed.[(1)]	Total	Reg.	Co-op	Work Study	Spec. Ed.[(1)]	Total
Total	13,400	1100	500	(3500)	15,000	14,500	2,500	1,000	(7,000)	18,000
White	5,500	500	---	(500)	6,000	5,500	500	----	(500)	6,000
Nonwhite	7,900	600	500	(3000)	9,000	9,000	2,000	1,000	(6500)	12,000
Disadvantaged	3,000	500	500	(1000)	4,000	3,500	2,500	1,000	(3500)	7,000
Handicapped	2,500	---	---	(2500)	2,500	3,500	----	----	(3500)	3,500

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(1) Students in Special Education programs are included in appropriate Regular, Co-op, or Work Study enrollments.

This will amount to 23% of the nonwhite 15-19 year olds compared with 20% of the white 15-19 year olds. As an alternative, we could have set enrollments at the same proportion of city school age population for both whites and nonwhites.

Only an estimated 25% of disadvantaged youth 15-19 in 1970 were enrolled in secondary education programs compared with the enrollment of 72% of the total population in this age group. Given a high priority for serving disadvantaged youth, it is reasonable to project increasing enrollments of the disadvantaged secondary school age youth in vocational education from 25% or 4,000 in 1970 to at least 50% or 7,000 of the estimated 14 thousands of these disadvantaged youth by 1975. This represents a 75% increase in enrollments of disadvantaged youth over five years.

The need to serve the handicapped is also a priority in the 1968 Amendments.(2) Only about 40% of the school age handicapped were reported enrolled in vocational technical education programs in 1970. Since training facilities for the handicapped are often more expensive than those for the disadvantaged, an objective might be to increase this to 50% by 1975.

These first three steps summarize the gathering and treatment of demographic information on the local level, in order to define specific vocational education objectives in terms of enrollments. To prepare a five-year plan and from this to specify the following year's program requires also that objectives in terms of program completions by occupational area be projected to 1975 based on an analysis of labor market information.

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(2) The Vocational Education Amendments of 1968 (P.L. 90-576)

Chapter 3

USING MANPOWER INFORMATION TO DEVELOP ENROLLMENT OBJECTIVES

Sample manpower information based on the experience of a particular Eastern city will be used to show some ways to handle manpower information in planning vocational education programs. Steps in this process are discussed in the following sections. Once the planner has worked up the basic manpower data described in this chapter, he is ready to begin to systematically relate this information to the demographic information and enrollment projections described in the last chapter. Before proceeding with the planning steps, however, it is necessary to review the types of manpower or labor market data with which the educator must be familiar. In order to set occupational program objectives sensitive to the labor market and educational needs of the population, the planner must have access to two basic types of information. First, he must have a measure of the employment opportunities for his students, preferably expressed in terms of annual job openings. This is an indicator of the demand for manpower with various types of education and training. Next, he must have an estimate of the number of graduates or completions per year from courses which provide such training both for public vocational technical education, and from other training agencies.

Annual Job Openings. Estimated annual job openings by occupation provide a measure of the number of new workers in an occupation for whom there will be jobs. The number of annual job openings does not include job openings which reflect the normal movement of workers from one job to another for which a sufficient supply of workers already exists. The jobs we are concerned with become available because the occupation itself is growing or because of the death or retirement of current job holders. Since the labor market is changing, and the educator is required to project educational programs five years ahead, he will want an estimate of these kinds of job openings by occupation five years from now.

The fortunate administrator may find that the employment service or some other local agency has already analyzed basic employment information for his locality and has derived the annual job openings information he needs. If this is not the case, the planner will have to seek out Employment Service, Labor Department or Census data, and make his own projections and derive annual job openings. The sources of data and methods for making such projections are described in Chapters 5 and 6.

The local State Employment Service (SES) office is the usual source of employment information. While the U. S. Labor Department has requested these offices to provide vocational education administrators with the type of job openings information which they require, in many cases funds required to develop this information on the local level are not available. In these cases, the local or state employment service may only be able to provide information on unfilled employment service job openings in the locality by OE coded Instructional Program. This will usually include an enumeration of:

1. Annual average number of E.S. job openings unfilled 30 days or more by occupation;

2. The anticipated national employment growth in percent over the next five years by occupation.

For vocational education planning, the annual average number of E.S. job openings unfilled 30 days or more in an occupation may be used as an estimate of the annual job openings in that occupation.

An estimate of annual job openings in an occupation five years hence can be made by multiplying current annual job openings in the occupation by the estimated national five-year rate of growth in employment in the occupation. If the rate of growth is 20% over the next five years and current annual job openings amounted to 200 there would be an estimated 240 openings in 1975. This method for estimating annual job openings will be relatively accurate only if:

-job openings are changing proportionally to employment; and

-the local employment picture is not significantly different from national trends.

If either of these two assumptions is not appropriate, the planner should adopt the following procedure:

If the planner can obtain state projections of demand by occupation, he can estimate the future demand for the occupation in his locality by applying the percent of state employment in the occupation in his area from U. S. decennial Census figures. For example, if Census data show that 15% of total state employment for carpenters occurs in his locality, he can assume that 15% of the State's projected annual job openings for carpenters will occur in his area. When recent census data are not available, he should calculate the proportion of the total state labor market which is represented by his locality. This can be estimated as the proportion of working age population (usually 18 to 64) in the state residing in the local area. For example, if his school system is located in a metropolitan area which contains 25% of the state's labor force aged 18-64, he can assume that, on the average, 25% of statewide employment occurs in his area. One-quarter of the state's annual job openings for each occupation would therefore represent an estimate of the job openings against which completions from his vocational education programs should be compared. The planner must adjust these figures for the local job market based on known differences between the state and local urban employment. For example, the urban area will contain fewer than 25% of the openings in agricultural occupations and will probably have more than one quarter of office occupations employment. Even if the statewide figures are not reduced, this technique will fairly define the statewide employment opportunities for completions from the school system, and thus allows for student mobility.

To identify job and career opportunities for the residents of an area, the educational planner must consider what "market" he is training for. Does he want to focus his programs on local demand, state demand, or national manpower needs? And what is local? To answer this question he should know where, typically his graduating students pursue and find employment. A good beginning will be to use the manpower projection of the entire metropolitan area. There are a number of reasons for using manpower data from the metropolitan area rather than the city, town, or suburb itself. Relating training needs to job opportunities logically begins where the majority of the job opportunities are going to be for the people of the community, and metropolitan area data may indicate areas of expanding job opportunity not reflected in the local labor market. So mobile is our society today,however, that projected manpower requirements of the state and nation may also be used as a larger context for vocational program decisions, but the opportunities they suggest for many will be more remote psychologically as well as geographically. The primary emphasis in the city plan, by and large, must remain the employment demand which is reasonably close to home, although the decision will depend on local circumstances. In the case of a suburban school district, Standard Metropolitan Statistical Area employment figures may represent a relevant employment market for students - even if part of the metropolitan area is in another state. For example, a vocational school in Teaneck, New Jersey, may find projections for the New York standard metropolitan area more relevant for planning than data for the state of New Jersey. A city in central New Jersey, however, may assume that a majority of its graduates find employment opportunity either locally or randomly throughout the state. If no local projections are available, statewide employment data may be most appropriate to use. A rapidly growing city in the Southwest may place a higher priority on local projections than national figures, while a city in a state like West Virginia,which is losing population because of a lack of employment opportunities, may prefer to use national employment projections or those of a neighboring state.

Training Program Completions. While job openings define the manpower demand side of the equation, training program completions define an important part of the supply. Obviously some of the job openings are filled by upgrading people already in the labor force and by those trained in proprietary schools and formal business, military, and on-the-job training programs. However, the relation between job openings and vocational education completions is a convenient measure of the employment opportunity available.

In order to make such a comparison it is necessary to express job openings and program completions in the same terms. The Office of Education has published a taxonomy of instructional program codes which relates training programs to occupations.(1) Local and state employment services will normally use this taxonomy in reporting employment or job opening information to vocational education administrators. The administrator in turn should aggregate completions from his programs by the same instructional program codes. Completions should be defined as graduates from terminal (12th, 13th or 14th grades) occupationally oriented courses.

There are many other characteristics of the labor market and the population which influence the choice of vocational education programs. While this information may be quantitative in nature, its primary function is to enhance the quality of the administrative decision. Therefore in addition to information on job openings, program completions, enrollments and school age population, the educator will wish to obtain some additional data.

Other Manpower Information. To see the main patterns of occupational demand developing for the metropolitan area, the state, and the nation, and to establish an overview of trends, the planner will wish to seek out information showing national and state as well as local employment forecasts in general occupational categories. How many jobs there are and how fast jobs are developing will be special points of interest. Studies are available in some localities and the national level from which five-year projections can be derived for either major occupational groups (broad classifications within white collar, blue collar, and service headings) or for employment by industry. In addition, local employers will be a valuable source of information. Projections of local industrial expansion, or of the location of new industries in the area will have a significant impact on employment patterns and therefore on job openings. Where this is the case, the vocational education planner should use this additional information to adjust the employment statistics. In most cases the Employment Service will have incorporated this information in their projections.

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(1) Vocational Education and Occupations, U.S. Office of Education Report # OE-80061, July, 1969.

Not all jobs are equal candidates for formal training so there are several characteristics of the jobs themselves which the educational planner must investigate. These include quantitative assessments of wage rates, seasonality, and promotion possibilities as well as a qualitative evaluation of the status of the job in the community, the job satisfaction of the employees, and the students' perception of the desirability of employment in the occupation. Other things being equal, the job which carries a higher entering wage, better opportunities for promotion and seems highly desirable to students deserves priority. In a local area this may not be the occupation showing the largest number of job openings, but fast growing occupations with less overall employment may be good candidates for training. New occupations developing out of expanding technology often offer considerable career opportunities even when the current employment market is small.

Finally, the educator must consider other routes to job entry besides formal secondary or post-secondary vocational training. For some jobs, regardless of the growth and magnitude of job openings, the availability of on-the-job training, or the lack of a requirement for pre-occupational training may argue against extensive vocational instructional programs. In other cases, the basic skill requirement for job entry may be easily obtained by all students in the general education program. In still other occupations, job training may be provided by special federal programs such as MDTA or the Job Corps, union apprenticeship or proprietary schools. In these cases, the educational planner must determine whether the demand for workers is significantly greater than the supply from these other training programs and whether these programs are projected to expand.

Four steps are involved in interpreting and translating manpower information into objectives in terms of enrollments by instructional program. Figure 3 summarizes these steps and indicates the analytic tasks involved and the table where results are recorded. The steps to be taken in using manpower or labor market information are discussed below.

Figure 3. STEPS IN USING MANPOWER INFORMATION
TO DEVELOP ENROLLMENT OBJECTIVES

Planning Steps	Analysis Task	Text Table
4. Identify Occupational Patterns	Estimate Job Openings for Occupations Relevant to Vocational Education	4
5. Relate Program Completions to Job Openings	Derive Completions as a Percent of Openings	5

	Planning Steps	Analysis Task	Text Table
6.	Set Completions Objectives by Instructional Program	Project Completions by Instructional Program Taking Account of Labor Market Changes	6
7.	Translate Completions to Enrollments	Estimate Enrollment in 1974-1975 Needed to Achieve the Desired Level of Completions	7

4. Identify Occupational Patterns and Define Employment Needs in Terms of Annual Job Openings.

To relate labor market changes to vocational-technical education, it is necessary to express employment demand in specific job categories which can be related to instructional programs. Such information will define for the planner the size of the labor market in occupations where vocational-technical education programs are appropriate sources of preparation.

In Table 4 job openings for 1970 and 1975 have been listed for representative occupations in our sample metropolitan area. The percentage change over the 1970-1975 period is also given. The occupations listed include five white collar, five blue collar, and one service occupation. They illustrate a variety of occupations in the city for which vocational training is often conducted in public schools, sometimes at the secondary and occasionally at the post-secondary level.

The selected occupations listed as examples in Table 4 illustrate the variety of developments in job openings which must be evaluated in planning for future occupational programs. *Salesmen* and *secretaries, stenographers, and typists,* are relatively high volume jobs in the example for the 1970-1975 period, but only the latter category is growing in opportunity. Growth jobs in the technical and service categories for the same period include medical and dental technicians, draftsmen, motor vehicle mechanics and practical nurses. With the exception of motor vehicle mechanics, the craftsmen and operatives occupations show a projected decline in annual job openings during this period. The planner will probably not wish to expand enrollments in occupational training programs in the face of such declining job markets. And conversely, expanding job opportunities for medical and dental technicians and motor vehicle mechanics suggest that instructional programs might be expanded in these fields. Selecting specific instructional programs to expand requires a comparison of public vocational program

Table 4

Sample Average Annual Job Openings
in Metropolitan Area

OE Program Code	Occupation	Current Job Openings 1970	Projected Job Openings 1975	Percent Change 1970-1975
	PROFESSIONAL, TECHNICAL, & KINDRED			
07.0103	Technicians, Medical & Dental	266	429	61%
17.1300	Draftsmen	66	93	41
	CLERICAL & KINDRED			
14.0700	Secretaries, Stenographers, Typists	3629	4,242	17
14.0399	Office Machine Operators	570	603	6
	SALES WORKERS			
04.0117	Salesmen	2992	3,216	7
	CRAFTSMEN, FOREMEN AND KINDRED			
17.1001	Carpenters	208	204	- 2
17.2302	Machinists	83	67	- 19
17.0302	Motor Vehicle Mechanics	217	325	50
	OPERATIVES & KINDRED			
17.2306	Welders & Flamecutters	163	148	- 9
17.3399	Sewers & Stitchers	204	114	- 44
	SERVICE WORKERS			
17.0205	Nurse, Practical	309	367	19

completions with this job opening information and other sources of trained workers.

5. Relate Program Completions from Public Vocational and Non-Public Education Programs with Present Job Openings.

Decisions to change vocational program priorities depend not only on what is happening in the job market, but what portion of the trained labor supply is being provided by vocational-technical education.

Before decisions can be made concerning enrollment objectives in public vocational-technical programs, it is necessary to compare the annual number of new workers needed with the number of such workers supplied from all sources. An expanding job market for Practical Nurses, for example, may not be a suitable program for public secondary education if local hospitals are planning to greatly expand their LPN training programs. Similarly, occupational opportunities for carpenters which may expand in the area due to anticipated federal funding for such purposes as Model Cities may cause a rapid increase in the size of apprenticeship programs, thus increasing the need for vocational education programs as a source of preapprenticeship preparation.

While public vocational program completions can be estimated from school records, there is no single source of information on non-public vocational or occupational training programs. Information on current and future completions from private trade schools, special federal programs and other sources can often be obtained through direct contact with private and business schools, unions, trade associations, or the Chamber of Commerce.

A worksheet summarizing changes in job openings, and relating these to current public and private vocational education completions is shown in Table 5. The planner will probably not use such a table in his formal plan, but the information it contains is essential for arriving at decisions concerning measurable objectives for occupational education programs.

In our example the fastest growing job opportunities are in the fields with the least amount of formal training being provided. Completions are less than 50% of job openings for all occupations showing a positive growth in job openings. In contrast, the two occupations where job opportunity is anticipated to decline involve public and private training programs now producing 80% or more of the skilled personnel required annually. This wide variation between potential changes in job openings and availability of formal preparation for these jobs suggests new priorities are required in vocational education programs to increase outputs from programs in growth occupations, and to

Table 5

Comparison of Annual Job Openings with Sources of Training in Metropolitan Area in 1970

OE Program Code	Occupation	1970 Annual Job Openings	1970 Completions from Vocational Education Public	Other[(a)]	Estimated Percent All Completions of 1970 Job Openings
07.0103	Technicians, Medical and Dental	266	25	16	15%
14.0700	Secretaries, Stenographers and Typists	3,629	800	249	29
14.0117	Sales Workers	2,992	220	--	
17.1001	Carpenters	208	54	170	108
7.0302	Motor Vehicle Mechanics	217	90	--	41
17.3399	Sewers and Stitchers	204	113	50	80
17.0205	Nurses, Practical	309	92	89	58

(a) Estimated from sampling of training in the metropolitan area.

decrease training in skill areas where job opportunities are declining. This leads to the next step in the planning process, setting educational objectives.

6. Set Specific Vocational-technical Education Completion Objectives

The above steps have laid out the basic manpower and vocational educational completion information the planner must develop for his long-range educational plan. His next task is to relate information concerning the present directions of the labor market and vocational education in order to develop specific educational objectives in terms of completions for vocational education programs in 1975. We shall first discuss these items of information and then describe how they are used in developing objectives. Labor market projections and educational completions from the public and private sector (illustrated in the previous two tables) give us the basic data required to establish output projections for vocational-technical programs.

In order to allocate resources, objectives must be stated as measurable targets to be achieved at a given future date. Five years is the target planning period under the Vocational Education Amendments of 1968, and therefore is the target date used in our examples. The terms used to define objectives should be quantitative education indicators such as number of completions by instructional program.

Educational completion objectives are illustrated in Table 6. For medical and dental technicians, we have projected increased vocational completions from 9% of annual job openings in 1970 to about 20% of openings in 1975. This is because the annual openings for these jobs are predicted to increase by over 60% during this period, yet very little training is available indicating that this occupation will provide growing employment opportunities for vocational students.

For secretaries, stenographers, and typists and for sales workers, no change in vocational education completions are projected. The reason for not expanding sales worker instructional programs is the fact that training is not as essential for employment as it is in other occupations. And though secretarial job openings will increase by 17%, it is felt this increase will be taken up by the projected expansion of private school enrollments in such programs. Also, as educational requirements increase, an expanding number of junior and four year college liberal arts graduates with typing and stenographic skills are expected to be employed in these positions.

In two of our sample occupations, one (motor vehicle mechanics) expanding and one (carpenters) experiencing no change, the planned proportion of completions to job openings will stay the same. This means that with employment expanding for motor vehicle mechanics, completions are projected to increase from 90 to about 135. No change in completions is projected

Table 6

Establishing Objectives for Public Vocational Education Program Completions

OE Program Code	Occupation	Actual Job Openings and Completions for 1970: Job Openings(1)	Actual Job Openings and Completions for 1970: Completions(2)	Projected Job Openings and Completions for 1975: Projected Job Openings(1)	Projected Job Openings and Completions for 1975: Target Completions	Rationale for Target Projection
07.0103	Technicians, Medical and Dental	266	25	429	80	Increase percent completions from 9% to 20% of job openings (very little private training)
14.0700	Secretaries, Stenographers and Typists	3,629	800	4,242	800	Maintain same level of completions (other training)
14.0117	Sales Workers	2,992	220	3,216	220	Maintain same level of completions (training not essential for job)
17.0302	Motor Vehicle Mechanics	217	90	325	135	Maintain same proportion of completions to job openings.
17.1001	Carpenters	208	54	204	54	Maintain same proportion of completions to job openings
17.3399	Sewers and Stitchers, Manufacturing	204	113	114	50	Reduce completions proportional to reduction in job opportunities
17.0205	Nurse, Practical	309	92	367	180	Increase proportion of completions to job openings from 30% to 50% (training essential for employment)

(1) From Table 4.
(2) From Table 5.

for carpenters. In the case of sewers and stitchers, a notable reduction in job openings will be reflected in a 50% reduction in completions from public vocational-education programs. Finally, the decreasing availability of LPN training in area hospitals suggests that the Vocational Education system increase LPN training at a rate faster than that of annual job openings. Thus, while annual openings will increase by 20% to about 370 by 1975, completions from the public schools are targeted to double in the same period and will reach 50% of the annual job openings by 1975.

7. Translate Completions to Enrollments

In order to arrive at a final set of objectives it will be necessary to adjust completions objectives to the realities of student characteristics. If we translate completions objectives into enrollments by instructional program required to produce those completions, we can compare these directly to the enrollment objectives derived from demographic data. Table 7 presents enrollments required for the completions objectives previously derived.

For some programs listed in Table 7, total enrollments exceed completions by a factor of four or five because of the anticipated drop-out rate and because the program is spread over two or three years and completions in any one year will amount to only one half or one third of enrollments. In others, such as practical nurses the program is made up of one course and most or all of the enrollees will complete the program in a year and only the dropout rate need be considered.

Table 7

Enrollments Required to Meet Completions Objectives for 1975

OE Program Code	Occupation	Completion Objective 1975	Enrollment Required 1975
07.0103	Technicians, Medical and Dental	80	150
14.0700	Secretaries, Stenographers and Typists	800	4,500
14.0117	Sales Workers	220	880
17.0302	Motor Vehicle Mechanics	135	735
17.1001	Carpenters	54	140
17.3399	Sewers and Stitchers, Manufacturing	50	160
17.0205	Nurses, Practical	180	200

Chapter 4

PREPARING A LONG RANGE PLAN

The treatment of manpower and socio-economic data in order to derive educational objectives has been presented in a series of working tables which the planner may use as a working format. Reporting this information in a formal document or plan requires the compilation of summary tables of objectives, enrollments, completions and resources. While state planning guidelines are undergoing change, and state requirements for local vocational education plans vary, at least three kinds of summaries will usually be requested for presenting the results of the planning process.

First, the plan will include a statement of the local education agency's goals and objectives. The derivation of this information was illustrated and discussed in Steps 3 and 7, and shown in Tables 3A and 7. Second, there should be a summary of projected enrollments by OE instructional program to meet the objectives; this is discussed in Step 8, and third, the plan will normally include projected changes in teachers, facilities and equipment to support the objectives, which is discussed in Step 9.

8. Match Projected Enrollment Objectives Derived from Manpower and Demographic Data.

We have illustrated in previous steps how specific educational objectives can be derived. These objectives may be summarized for completions and enrollments as follows:

In order to make the city's secondary vocational education programs relevant to the educational needs of target populations, the following objectives were defined (see Table 3A):

a. A 20% increase in enrollments is projected for all secondary vocational education.

b. Enrollments of students in part-time secondary programs will be increased by 120%.

c. Enrollments of students from disadvantaged families (incomes under $3,000) will be increased by 75%.

d. Enrollments of nonwhites is projected to increase by 33 1/3% and of handicapped by 40%.

Objectives in terms of completions, based on labor market changes, should be summarized in an early part of the plan. In order to make the city's vocational education programs more responsive to the local labor market in this example, the following completion objectives were defined (see Table 7):

a. Completions in programs in the health occupations will be expanded over the next five years as follows:

Instructional Program	Projected Change in Completions, 1970-1975 (in percent)
Medical and Dental Technicians	220%
Nurses, Practical	96%

b. Completions in technical and industrial occupations will be changed to meet anticipated changes in the labor market.

Carpenters	No change
Motor Vehicle Mechanics	+ 50%
Sewers and Stitchers, Manufacturing	- 53%

c. For distributive occupations and office occupations, no change in annual completions are projected for 1975.

Total projected enrollments by instructional program and by type of program must be related in the final vocational education plan. Enrollment projections by general program type have already been projected in Table 3A. The projections of completions by instructional program code have been translated into enrollments in Table 7. Once instructional program information has been translated into enrollments, these should be distributed among program types. In the example in Table 8, we suggest segmenting programs in terms of Full Time, Cooperative, Work-Study and Special Education. Other school systems may wish to add an exemplary program category, and/or break down full-time enrollments into those in vocational-technical high schools and those in the comprehensive high schools. We have omitted such a breakdown here in the interest of simplicity.

The demographic projections described earlier in this report suggest that a major expansion of cooperative and work-study programs will be required to serve the needs of students who must work for economic reasons.

In our example, secondary vocational education enrollments are projected to increase from 36 to 37 thousand from 1970 to 1975. Gainful occupational preparation enrollments will increase from 15 to 18 thousand. Distribution of enrollments by instructional program results in 3,500 of the enrollees being able to work as well as study. All of the occupational preparation programs given as illustrations except medical and dental technicians are available to part-time as well as to full-time students. It is assumed the medical and dental technician training on the secondary level is preparatory to a post-secondary program and is therefore most appropriately scheduled for full-time students. It is also anticipated that servicing the needs of the disadvantaged should include the rapid expansion of cooperative and work-study programs in fields that promise readier employment upon graduation. We therefore project a majority of motor vehicle mechanics enrollments in work-study programs, expansion of distributive education in cooperative programs and a tripling of cooperative or work-study enrollments for secretaries, stenographers and typists.

Special education program enrollments of seven thousand in 1975 allow for remedial education, counseling and job coaching components for half of the 7,000 disadvantaged students and all of the 3,500 handicapped students projected to be simultaneously enrolled in regular instructional programs.

The total enrollment figures for 1970 and 1975 entered in Table 8 were derived from enrollments objectives. The distribution of enrollments for each instructional program into regular, cooperative and work-study programs is based on the administrators' best feel for the type of student to be attracted by each program, the number of employers he can make work-study arrangements with, and his estimates of student preferences. Since many of these factors can change markedly over a five-year period, annual updating of this plan is essential.

The "other occupations" category in this table is large only because we have chosen to illustrate these planning steps with seven selected occupations. All vocational instructional programs offered in the school system in 1970 should be included in actual planning tables. New instructional programs planned after 1970 but before 1975 should also be included. In many cities there is a growing use of teacher and social welfare aides, and increasing emphasis on the nation's transportation system will open up many jobs for heavy equipment operators, truck drivers and deliverymen. Secondary vocational education may be a logical spot for new formal training efforts like these.(1)

This table presents a summary of the plan, the total projected enrollments by occupational area and type of instruction required to fulfill the objectives of the plan. While these are projections and not

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(1) National Goals and Vocational Education Priorities in the 1970's, National Planning Association, Center for Priority Analysis, 1970.

Table 8

Enrollment Projections for Vocational Education, 1970-1975

Instructional Program	Actual 1970					Projected 1975				
	Reg.	Co-op	Work Study	Special Education	Total	Reg.	Co-op	Work Study	Special Education	Total
Total (Gainful)	13,400	1,100	500	(3,500)[2]	15,000	14,500	2,500	1,000	(7,000)[2]	18,000
Medical & dental technicians	50	--	--	--	50	150	--	--	--	150
Secretaries, stenographers & typists	4,000	500	--	(1,000)	4,500	3,000	1,000	500	(2,000)	4,500
Sales workers	800	80	--	(250)	880	200	680	--	(500)	880
Motor Vehicle Mechanics	250	50	250	(175)	550	300	135	300	(350)	735
Carpenters	100	40	--	(25)	140	100	40	--	(50)	140
Sewers & stitchers	200	--	120	(25)	320	100	--	60	(50)	160
Practical nurses	100	--	--	(25)	100	100	100	--	(50)	200
Others[1]	7,900	430	130	(2,000)	8,460	10,550	545	140	(4,000)	11,235

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(1) Large because only selected occupations used in this example; all should be listed in the plan.

(2) Duplicate enrollees listed elsewhere.

Note: Distribution of total 1975 enrollments by type of program from Table 3A.
Distribution of total 1975 enrollments by instructional program from Table 7.

predictions, they are target values the administrator hopes to achieve within the next five years. His following year's effort, in this example the annual plan for 1971, should reflect some progress toward achieving each of these objectives, and shifts in enrollments should occur in the directions indicated by the five-year plan.

9. Estimated Resources Required to Achieve Stated Objectives.

To support changes in program objectives, the administrator must forecast changes in facilities (or at least facility utilization), teachers, and equipment to service the changing pattern of enrollments. The particular combination of the resources to apply to each program depends not only on projected enrollments but also on program design. On the one hand a given school may be operating traditional lecture-workshop classes with full-time teachers, or may use part-time teachers from business and industry. On the other hand instructional technology may accelerate changes in the ratio of teachers to pupils and the use of special teaching equipment. A change in types of programs offered may change resource requirements. However, whatever the instructional methods employed, the projected requirements for teachers, equipment and facilities and their associated costs must finally be related to the estimated number of students enrolled in each instructional program. Similarly, the growth in counselors and other special support personnel must be related to the educational objectives in long-range plans.

Table 9 presents an example to illustrate the task of relating the various types of information discussed in this report. The planner enters in column 4 the current number of teachers for each instructional program. This projected teacher requirements for 1975 (column 5) must then be related to the changes in enrollments (column 3 minus column 2) and the distribution of these enrollments as shown for this example in Table 8.

For example, for automotive mechanics programs, an enrollment increase from 550 to 735 is expected, or an increase of more than 30 percent. An increasing number of these will be in part-time programs so it is reasonable to project a smaller percentage increase in teachers than in enrollments. Therefore, we have illustrated a 20 percent increase in teachers. Similarly, a doubling of enrollments in practical nurse programs (last row in Table 8) is matched by a projected doubling of the number of teachers for these programs in Table 9.

Table

Exemplary Completed Format for Vocational Education Planning

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9) (10) (11)	(12) (13)
OE Program Code	Vocational Enrollments		Teacher Requirements		Facility Requests 1970-1975				Budget 1970-1975	
	A 1970	O 1975	A 1970	P 1975	A Sq.Ft.	$	P Sq.Ft.	$	A Total/Pupil	P Total/Pupil
Total (gainful)	15,000	18,000								
Medical and Dental Technicians	50	150	2	3(1)	NO CHANGE (2)				---------	----------
Secretaries, Stenographers and Typists	4,500	4,500	388	400(3)		(2)			---------	----------
Sales Workers	880	880							---------	----------
M.V. Mechanics	550	735	55	65	Increase in space				---------	----------
Carpenters	140	140								
Sewers and Stitchers	320	160	25	18	Decrease in space				---------	----------
Nurses, Practical	100	200	5	10	Increase in equipment provided by cooperating hospital				---------	----------
Others	8,460	11,235								

NOTES: Data for columns (1), (2), and (3) are from Table 8.
(1) Increased teachers' loads are shifts from part-time to full-time teachers.
(2) Space available in current facilities.
(3) Decrease in teacher:student ratio.

Similarly, facility and budget projections must be related to these objectives. A form with all data entries through column 13 will suggest the kinds of facility and budget changes which may be required to meet these objectives.

It must be understood that changes in resources need not be directly proportional to anticipated enrollment changes. For example, the rapid expansion of enrollments in medical technician courses might be accomplished by adding special part-time teachers, by keeping teachers at their current level and adding teacher aides, or by maintaining the current teaching staff and introducing computer assisted instruction in mathematics and biological science skills. Similarly, doubling of enrollments in practical nurse programs might be accomplished by expanding night courses or might be conducted on a part-time basis through cooperation with a hospital on a reimbursement basis, rather than by doubling the teaching staff. Each of these alternatives has different implications for teachers, equipment, and facilities, but some mix of resources must show a change responsive to projected enrollments by program.

When planned course reductions in enrollments are anticipated, as is the case with sewers and stitchers in our example, there need be no automatic proportional reduction of teachers. Teachers are assumed to have tenure and will continue on the staff unless they retire or transfer out of the system. If the reduction in enrollments is slow, there may be no problem. Normal attrition may be operative, or alternative duties may be found for the surplus teachers. If teachers must be transferred, available teacher skills may be taken advantage of in other courses requiring related skills -- sewing in home economics courses, for example.

In all cases, the final enrollment objectives selected will depend not only on the availability of teachers, equipment, and facilities, but on an anticipated school budget. If the budget is growing too slowly over a five-year period, while either expanded enrollments or more costly programs appear necessary in the light of educational objectives, innovative low-cost program alternatives may be required. This may involve better scheduling of facility usage, more cooperative efforts with local employers, or the use of supplemental teacher aides. If none of these alternatives can be arranged, enrollment objectives will have to be modified. If school budgets can be anticipated to increase while enrollments remain relatively constant, on the other hand, the administrator has an opportunity to improve teacher-student ratios, to purchase more modern equipment, expand the guidance programs, or improve facilities. In each case, however, the improvement or expansion intended should support an enrollment objective and not be carried out for its own sake. The expenditure of both current and increased budgets should always be related in the planner's mind and in the planning document to the achievement of specified vocational education objectives set in Table 9.

A comparison of current and projected enrollments from columns 2 and 3 of Table 9 will tell the planner how far he has to go to achieve his 1975 objectives and he should set his 1971 objectives to reflect some progress in this direction. After costing out the 1971 program, he may be forced to reduce his 1971 objectives in light of the maximum resources he anticipates. These levels, however, will probably be in excess of the actual resources which will be provided, and the 1971 objectives will again have to be reduced. The higher figures should be used in the plan since the 1971 plan will be used to justify the level of support requested and to argue for more funds. The five-year enrollment objectives should similarly reflect desired levels of performance rather than reasonable expectations of available resources. The analysis of resources required for these objectives may reveal areas where special efforts are required (such as in-service training of remedial education teachers, or construction of new facilities) which will need substantial lead-time. These objectives may have to be deferred to a later date if resources are not provided but they set the frame of reference for all vocational education planning by telling the planner, in quantifiable terms, where he wishes to go.

The steps outlined in this section will help the vocational education administrator organize his future programs around a set of objectives. The plan which he prepares based on such a systematic development process can be employed in communicating these objectives and requirements to local and state Advisory Councils and to the State Department of Education. They will also improve the performance of the local vocational programs in meeting stated goals and will serve as a sound foundation for arguing for the additional funds needed to meet these goals.

PART II

Chapter 5

SOURCES OF DATA FOR PLANNING

1. Labor Market Data

Manpower Data. Data on labor force by age and sex for states and local areas may be available from studies conducted by state planning departments utilizing Bureau of Labor Statistics techniques for developing projections using national employment trends. Studies may also have been done in this area by private research organizations such as the labor force projections study by the Battelle Memorial Institute for the State of Michigan. (1) University research center studies are another possible source. National data are available from the Manpower Report of the President, (2) which assesses major changes in the labor force for the entire United States.

Tables illustrating the type of statistical data which can be developed are presented on the next two pages. Table 1 shows a distribution of the labor force by age group for the sample SMSA, the rest of the state and the United States. To better demonstrate relationshps, the same data is expressed in percentages in Table 2. The tables do not show male and female data but these can be expressed by the same age intervals as in the totals. (3)

The same format may be followed for presenting the nonwhite labor force and the labor force participation rates data. For estimating nonwhite labor force participation rates by age groups in our state and city example, adjusted U.S. labor force participation rates (4) were derived for Baltimore and Maryland. Adjustments were based on projected participation rates obtained from the National Planning Association projections study. (5)

Similarly, educational attainment data indicating the amount of schooling achieved by individuals within the labor force may be presented and also expressed in percent. (See Table 3.) National data for this particular variable for 1960 were obtained from the U.S. Census and for

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(1) See the Michigan Manpower Study: An Analysis of the Characteristics of Michigan's Labor Force in the Next 15 Years, Battelle Memorial Institute, November, 1966.

(2) Manpower Report of the President, published annually, U.S. Department of Labor, through the Government Printing Office, Washington, D.C.

(3) Ibid.

(4) Ibid.

(5) Economic and Demographic Projections for States and Metropolitan Areas, National Planning Association, Report No. 68-R-1, January, 1969, p. s-237.

Illustrative Table 1
Labor Force by Age and Sex for 1960, 1970, and 1975 for the Baltimore SMSA, The Rest of the State of Maryland and the United States
(in 000)

Category	Baltimore SMSA			Rest of the State			United States		
	1960	1970	1975	1960	1970	1975	1960	1970	1975
Total									
15-19 years	40.0	56.6	56.5	31.4	49.5	54.4	6,200	8,570	9,328
20-24 years	67.8	120.3	137.0	47.6	93.2	106.5	7,497	11,733	13,196
25-64 years	567.6	631.4	694.8	390.3	529.9	600.5	56,005	62,497	67,830
65 years old and over	27.6	33.4	32.7	18.1	22.5	27.1	3,379	3,199	3,292
Total, 15 years old and over	703.0	841.7	921.0	487.4	695.1	788.5	73,081	85,999	93,646
Male									
(Same age intervals)									
Female									
(Same age intervals)									

Sources: The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980, The Maryland State Planning Department, 1969; Manpower Report to the President, U.S. Department of Labor, 1967, Table E-2, p. 268.

Illustrative Table 2

Labor Force by Age and Sex for 1960, 1970 and 1975 for the Baltimore SMSA, The Rest of the State of Maryland and the United States
(percent distribution)

Category	Baltimore SMSA			Rest of the State			United States		
	1960	1970	1975	1960	1970	1975	1960	1970	1975
Total									
15-19 years	5.7%	6.7%	6.1%	6.4%	7.1%	6.9%	8.5%	10.1%	10.0%
20-24 years	9.6	14.3	14.9	9.8	13.4	13.5	10.3	13.6	14.1
25-64 years	80.8	75.0	75.4	80.1	76.3	76.2	76.6	72.7	72.4
65 years old and over	3.9	4.0	3.6	3.7	3.2	3.4	4.6	3.7	3.5
Total, 15 years old and over	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male (Same age intervals)									
Female (Same age intervals)									

Sources: The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980, The Maryland State Planning Department, 1969; Manpower Report to the President, U.S. Department of Labor, 1967, Table E-2, p. 268.

Illustrative Table 3
Educational Attainment of Labor Force by Sex, 1960, 1970 and 1975 for the Baltimore SMSA, the Rest of the State of Maryland and the United States
(in 000)

Category	Baltimore SMSA			Rest of the State			United States		
	1960	1970	1975	1960	1970	1975	1960	1970*	1975
Total									
Less than 8 years	160.0	121.2	108.8	109.4	99.5	93.4	17,644		14,524
8 years	86.2	81.3	76.5	59.4	67.2	66.1			
1-3 years high school	152.6	185.9	199.6	107.3	154.8	172.6	13,711		18,047
4 years high school	169.4	249.3	295.8	117.8	206.1	251.5	17,212		31,353
1-3 years college	62.8	96.9	114.3	43.7	79.5	96.6	6,636		11,876
4 years or more college	72.2	107.2	126.1	50.0	88.9	107.1	6,255		11,854
Total	703.2	841.8	921.1	487.6	696.0	787.3	61,458		87,654
Male									
(Same educational levels)									
Female									
(Same educational levels)									

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* Not available

Sources: The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980, Maryland State Planning Department; Occupational Characteristics, U.S. Census of Population, 1960, PC(2)-7A, pp. 116-129.

1975 from National Planning Association projections of educational attainment to 1975. (6) 1970 U.S. Census data will soon be available for updating these estimates.

Table 125 in Detailed Characteristics, U.S. Census of Population entitled "Industry Group of the Employed, by Occupation and Sex, for the State or Standard Metropolitan Statistical Area of 250,000 or More: 1960," shows employment by industry data in the various occupations (professional to service workers) for 43 industrial categories.(7) Equivalent data for 1970 will soon be available in the 1970 Census. This data is generally comparable to the Standard Industrial Classification Code (SIC), with certain qualifications such as the difference in the classification of government workers in the SIC and the Census. (All government workers in the SIC are classified into one major grouping while the Census, on the other hand, classifies government workers in service agencies into the appropriate industrial category i.e., government medical workers in the medical services.)

The above data were used by the National Planning Association as a base for developing employment projections to 1975 and 1980 by industry for the nation and for state areas.(8) This study shows employment by industry for 1966, 1968, and projected 1975 and 1980 in 33 different industrial categories. Twenty-one manufacturing industries are included and a breakout of commodity and non-commodity producing industries is provided.

State planning departments, labor departments and private research organizations may also have developed employment by industry projections. For our sample area, industry employment projections were developed by the Maryland State Planning Department in its study, The Labor Force of Maryland, Projections of Socio-Economic Characteristics to 1980. This study contains projections for the major occupational groups in 31 industry sectors for six sub-regions and for the whole state.

Planners who wish to develop their own industry projections can do so by using the simple ratio method. If data for the particular industry are available for at least two-year points, preferably five years apart, a time trend can be established to project these data to 1975. See Chapter 6, pages 57 and 58 for sample calculations of this projection technique. The resultant ratio can then be applied to the 1970 national employment projection to allow an estimate of employment in the industry for the state or local area. 1975 national employment by industry projections have been developed by the Bureau of Labor Statistics and are presented in Appendix B, Volume IV, Tomorrow's Manpower Needs.

This ratio method, however, applies well to industries that cater to a national market, yielding better results than when applied to those responsive to local trends or economic conditions. For the latter industries, states developing their own projections can rely upon regression techniques to measure influences of local factors upon the employment of their industries. Experiences of states developing their own industry projections utilizing these techniques are described extensively in Tomorrow's Manpower Needs. (9)

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(6) Chong K. Park, "Economic Changes, Manpower Requirements and Their Implications for Educational Policy in the Next Two Decades," unpublished National Planning Association Study, April 1968, Appendix Table 8.

(7) "Detailed Characteristics," Characteristics of the Population, 1960 Census of Population, Series PC-(1)-1 D to 53 D, Chapter D, Table 125.

(8) Economic and Demographic Projections to 1975 and 1980, "Area Employment Profile," National Planning Association, Regional Economic Projection Series, Report No. 70-R-1, Table 2.02, Washington, D.C., April, 1970.

Employment by major occupational group by sex and race and employment by detailed occupation by sex and race are available for each state from the 1960 Census(10) which show the detailed occupation of the employed, by sex, for the entire state, (including separate urban and rural totals) and for standard metropolitan areas of 100,000 or more. The Census defines as employed, all persons, 14 years old and above "at work" or "with jobs but not working" due to illness or similar reasons. The Census provides data on the number employed by occupational group (for example, clerical and kindred workers), occupational category within the group (for example, secretaries, stenographers and typists) and occupation group and category by industry (for example, secretaries, stenographers and typists in the construction industry.) Should more detail on these categories be desired, the Classified Index of Occupations and Industries, U. S. Bureau of the Census, shows what minor occupations are included in each of the categories. Additional statistical detail however, must be requested in writing from the Office of the Chief, Population Division, U. S. Bureau of the Census. The planner also is reminded that the 1970 Census will soon be available for comprehensive employment data.

More recent data than 1960 may be obtained from the research and analysis divisions of the State Employment Security agencies. Though it is possible that the available data are not based on actual count but on estimates developed from industrial-occupational matrices, they should still prove useful as a guide if historical information is not available. State planning departments are also another important source of historical as well as projected employment data.

Other sources of data on selected occupations are statewide and SMSA surveys conducted by local chambers of commerce, the Federal Reserve Banks, research divisions of professional organizations, trade unions, and licensure agencies. State and local data may also be available on employment in teaching, health and other occupations from Federal agencies responsible for programs in these special areas.

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(9) See the New York State experience, "New York State Department of Labor's Manpower Projections for the State and Its Areas, a Preliminary Report on Method", Volume I, Tomorrow's Manpower Needs, U. S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 1606, Washington, D.C., 1969, pp. 18-46. See also the State of Denver experience, in Methodology for Projection of Occupational Trends in the Denver Standard Metropolitan Statistical Area, prepared for the Office of Manpower Policy, Evaluations and Research, U.S. Department of Labor, by the Bureau of Economic Research, University of Colorado, Boulder, Colorado, March 1966.

(10) "Detailed Characteristics," Characteristics of the Population, 1960, op. cit., Table 121.

Projections of national data are available from the study, Manpower Requirements for National Objectives in the 1970's which estimates employment levels necessary for the pursuit of given economic and social goals (11) and from the Bureau of Labor Statistics report bulletins, Occupational Employment Patterns for 1960 and 1975, and Tomorrow's Manpower Needs, (12) which project national employment by occupation and industry to 1975.

Table 4 shows employment by major occupational group for a sample city and state and the United States. This data could be similarly expressed in the same format for male, female, and in percent. (Employment data for farm occupations was distributed among the other categories and was not reported separately.) Employment by detailed occupation is shown in Table 5. It provides sample detailed occupational categories from each main occupational group, selected from the 30 largest occupations in the 1960 Census for the Baltimore SMSA and the state of Maryland.

In selecting the above occupational categories, the largest occupations in the 1960 Census for the SMSA and state were identified and ranked according to size. Out of the 30 or so largest occupations, those of particular interest to vocational education (on the basis of high employment growth, existing vocational programs or training potential) were selected from each main occupational group. Since the Bureau of Employment Security did not provide employment projections for all the occupations in Table 5, estimates based on the 1960-1975 occupational matrices in Tomorrow's Manpower Needs were used in deriving average annual job openings presented in Chapter III, Part One.

Employment and Earnings. These data which show the relationship between employment and income are available from the Employment and Earnings series and the Area Wage Surveys published by the Bureau of Labor Statistics. The latter provides statistics on the labor force, employment, man-hours, earnings and rates of labor turnover for large cities and their adjacent suburban counties. Hourly earnings for "Production workers on manufacturing payrolls" for the SMSA in our example were derived from this source. (See Table 6.) Earnings for the Selected occupations were estimated from data on average weekly hours and earning by occupation and industry in the Area Wage Survey. (For each selected occupation, the average weekly earnings in each industry were divided by average weekly hours in each industry giving the average hourly earnings of each selected occupation by industry. Average hourly earnings for each selected occupation by industry were then weighted by the number of workers in the occupation in each industry providing average hourly earnings in the area for each selected occupation.) Area Wage Surveys provide pertinent weekly salary and earnings data for each metropolitan area based on annual occupational surveys. A list of available surveys can be obtained from the U.S. Bureau of Labor Statistics.

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(11) Leonard A. Lecht, Manpower Requirements for National Objectives in the 1970's, report to the Manpower Administration, U.S. Department of Labor, 1968.

(12) See Appendix E, Volume IV, Tomorrow's Manpower Needs, op. cit.

Illustrative Table 4

Employment by Major Occupational Group, 1960, 1970 and 1975, for Baltimore SMSA, the Rest of the State of Maryland and the United States

(in 000)

Category	Baltimore SMSA			Rest of the State			United States		
	1960	1970	1975	1960	1970	1975	1960	1970	1975
White collar	336.6	394.7	435.8	207.6	289.4	341.8	29,093	39,128	43,361
Professional & technical	80.2	103.4	119.3	61.6	84.2	100.9	7,232	10,721	12,413
Managerial	66.6	67.6	69.8	54.7	63.0	69.4	7,916	10,523	10,952
Clerical	131.0	157.0	174.9	62.2	95.3	116.9	9,306	12,974	14,713
Sales	58.8	66.7	71.8	29.1	46.9	54.6	4,639	4,910	5,283
Blue collar	282.1	292.6	303.6	139.6	172.4	194.1	25,193	29,904	31,482
Craftsmen	104.5	113.3	119.3	43.3	64.1	75.7	8,742	10,038	10,722
Operatives	129.7	138.2	144.7	49.7	62.9	71.3	11,898	13,848	14,560
Laborers	47.9	41.1	39.6	46.6	45.4	47.1	4,553	6,018	6,200
Services	83.8	95.3	104.0	29.3	46.0	55.8	7,172	11,271	12,811
Private household									
Other services									
Farm									
Total	702.5	782.6	843.4	376.5	507.8	591.7	61,458	80,303	87,654

Sources: The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980; "Detailed Characteristics," Characteristics of the Population, U.S. Census of Population for 1960, PC (1) - 1 D, p. 528; Leonard A. Lecht, Manpower Requirements for National Objectives in the 1970's, Report to the Manpower Administration, 1968, pp. 294-298.

Illustrative Table 5
Employment by Detailed Occupation, 1960, 1970 and 1980 for the Baltimore SMSA and the State of Maryland

Occupational category	Baltimore SMSA			State of Maryland		
	1960	1970	1980	1960	1970	1980
Professional & technical						
Medical and dental technicians	1,535	3,000	4,598	2,727	5,082	7,884
Clerical						
Stenographers & typists	25,409	37,915	56,305	51,458	67,747	95,690
Craftsmen						
Carpenters	7,419	7,797	8,022	15,182	16,707	19,561
Motor vehicle mechanics	5,793	8,100	9,700	11,479	(a)	(a)
Welders & flamecutters	4,263	5,477	6,257	5,483	7,195	8,841
Machinists	5,433	5,388	5,013	8,313	8,136	7,671
Operatives						
Drivers, bus & truck	14,585	17,897	31,569	26,187	31,569	38,093
Sewers & stichers, manufacturing (b)	5,789	6,177	4,923	9,963	8,836	8,940
Service						
Attendants, hospital & other institutions	4,930	7,897	12,351	7,198	11,719	18,735
Policement and other law enforcement	4,640	5,989	7,493	12,563	10,713	14,840
Practical nurses	1,652	2,776	4,424	2,847	5,052	8,226

(a) Not available

(b) Projected to decline on the basis of occupational group employment trends in the Maryland Labor Force Study.

Sources: "Detailed Characteristics," *Characteristics of the Population*, U.S. Census of Population, 1960, PC (1) 22 D, Maryland, Table 121, pp. 22-287-292; *The Labor Force of Maryland: Projections of Socioeconomic Characteristics to 1980*, Maryland State Planning Department, 1969; Data on employment in the Baltimore metropolitan area related to vocational education released by the Maryland Department of Employment Security, Research and Analysis Division, June 1969.

Per capita personal income data for states and areas are available from the National Planning Association study, Economic and Demographic Projections for States and Metropolitan Areas. The data (in terms of 1966 dollars) are provided for each state, for metropolitan areas, and for the United States, and are projected to 1985. 1970 data were not developed in this study so the 1970 figures were estimated through extrapolation. (For this procedure, see Chapter 6, page 57.) Some projections have also been made by the Office of Business Economics, U.S. Department of Commerce.

Similar data may be available from studies supported or initiated by the bureaus of economic research or industrial research departments of universities. (13) However, these are usually limited to a particular state or area.

Tables showing sample data on these variables follow.

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(13) See, for example, "Provisional Population and Labor Force Projections for South Carolina Counties, 1975 - 2000," a research project by Sang O. Park supported by the Faculty Basic Research Committee and the Department of Industrial Management, Clemson University, South Carolina, and featured in the Clemson University Review of Industrial Management and Textile Science, pp. 33-46.

Illustrative Table 6
Average Hourly Earnings for Selected Occupations and Their Relatives to Production Workers in Baltimore SMSA, 1968

Occupation	Hourly earnings	Earnings Relative
Production workers on manufacturing payrolls	$ 3.22	100.0
Selected occupations (all industries)		
Secretaries	2.91	90.3
Stenographers	2.51	78.0
Typists	2.21	68.6
Draftsmen	3.80	118.0
Carpenters (maintenance)	3.51	109.0
Machinists (maintenance)	4.01	124.5
Guards and watchmen	2.16	67.1
Truckdrivers	3.18	98.8

Sources: Employment and Earnings, March, 1969, Table C-10,p. 104; Area Wage Survey: The Baltimore, Maryland Metropolitan Area, September 1968, Table A-3, p. 15, Bureau of Labor Statistics.

Note: The "Earnings Relative" column shows the hourly earnings for each selected occupation taken as a percent of the average total hourly earnings of production workers on manufacturing payrolls in the sample SMSA.

Illustrative Table 7
Per Capita Personal Income in Baltimore SMSA,
Maryland, and the United States, 1960, 1970 and 1975
(in 1966 dollars)

	1960	1970 (1)	1975
U.S.	$ 2,400	$ 3,360	$ 3,930
Maryland	2,540	3,650	4,290
Baltimore	2,640	3,570	4,120

Source: Economic and Demographic Projections for States and Metropolitan Areas, National Planning Association, Report No. 68-R-1, 1969, pp. S-36 and S-37.

(1) **Estimated from 1960 and 1966 per capita personal income growth.**

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2. Socio-Economic Data

Demographic Data. At the outset the planner may find that demographic data may not be as convenient to locate as manpower information. Because of the scarcity of data, he may find it difficult to confine himself to one source and may have to rely upon several documents. He may then be faced with a problem of interpreting inconsistent data since it is not unlikely that the several sources used will provide different estimates for the same variable. And, where the differences result from the use of different definitions, assumptions, etc., he will still have to determine which data are most useful for his planning needs. A rule-of-thumb to follow is to select:1.) the most recent data,2.) historical statistics ahead of estimates, and 3.) data projections developed by special studies instead of extrapolated trends. (The source agency's expertise in making the estimates,however, must also be considered.)

The main source for population and other pertinent demographic data (such as percent of population in selected age groups; minority groups in the population; family trends and low income family patterns; and other indicators of disability and social dependency) is still the U.S. Census of Population. Detailed guidance for locating population data in the Census and other government publications is given in the Directory of Federal Statistics for Local Areas, 1966, (the most recent and updated version) published by the U. S. Bureau of the Census. Other important sources are state departments of health reports on resident births and resident deaths in the population, studies by the Department of Health, Education and Welfare on social welfare and the poverty population, and the series, Analysis of the Housing Market, published periodically by the Federal Housing Administration for SMSA's and other local areas. These reports provide valuable local economic and demographic descriptions particularly useful for planning and analysis. An example of synthesizing population and family patterns data from various sources is presented in Table 8.

Illustrative Table 8
Population Trends and Low Income Family Patterns, 1968, 1970 and 1975 in Baltimore City
(in 000)

	1968	1970	1975
Total population	929.2 a/	928.8	927.8 b/
Average Family size c/	3.68	3.65	3.57
Total Number of Families	252.5	254.5	259.9
Percent of Families with Incomes Less than $3,000 a/	13 %	12 %	10 %
Number of Families with Incomes Less than $ 3,000	32.8	30.5	26.0
Number of Children Under Age 20 in Poor Families, Total d/	74.7	69.5	59.3
Under Age 6	24.5	21.5	17.8
6-13 years	32.8	31.3	26.7
14 -17 years	12.6	12.2	10.7
18-19 years	4.8	4.5	4.1

Sources:

a/ Analysis of the Baltimore, Maryland, Housing Market, as of May 1, 1968, Department of Housing and Urban Development, Federal Housing Administration, January, 1969.

b/ Curtis C. Harris, Jr., State and County Projections: A Progress Report of the Regional Forecasting Project, University of Maryland Bureau of Business and Economic Research, January 1969.

c/ Projections of the Number of Households and Families, 1967 to 1985, Series P-25, No. 394, June 6, 1968.

d/ Social Security Bulletin, March 1968 and unpublished HEW tabulations of poverty population. Based on the number of children under 20 years of age per poor family = 2.28 as estimated from these sources.

3. Educational Data

Enrollments. These data should include total public school enrollment, public secondary enrollment, and public senior high enrollment by age, sex, and race. Data for the state and SMSA are available from annual reports of state boards of education showing public school enrollment by grade and local unit. Reports released by the local education agency research and development units may provide enrollment forecasts or trend projections, data on pupil desegregation, number of pupils and classes, or annual reports of net roll by grades and programs.

Data should include vocational education enrollments: 1) by type of group served (secondary, post-secondary, adult, cooperative, handicapped, disadvantaged); 2) by curriculum (vocational-technical, general vocational, special curriculum, consumer-home economics); and 3) by specific training programs (carpentry, electronics, etc.). State departments of education may indicate in their state plans for vocational education the number of vocational enrollments by type of group served, by curriculum or by federally-funded training programs for the state and for the SMSA's, or may present these data as estimated percentages of secondary high school enrollments or given group populations, i.e., adult, handicapped or disadvantaged. Annual reports of the state boards of education and the research studies done by the research bureaus of the local education agencies are also primary sources of the above data. Furthermore, enrollment data by specific training program may be obtained from reports on enrollments by level of reimbursable and reimbursed programs which are submitted by the state departments of education as part of their annual budget requests to the U.S. Office of Education.

The planner is also reminded of the need to obtain actual counts or estimates of nonwhite enrollments by these categories.

Vocational Education Completions. These data may be available in state and local education plans for vocational education showing completions in OE coded federally-funded instructional programs (secondary, post-secondary, etc.). They may be included in analyses of manpower needs and employment opportunities in the state or local area prepared by state educational planning units or the research bureau of local education agencies.

Withdrawals and Follow-Up (Secondary Level).

Data on withdrawals, possibly including all types of student transfers (out of county, private school, out of state) and follow-up on secondary public school graduates may be available from guidance and counseling units or from the research bureaus of the state and local education systems. Additional pertinent data could also be obtained from annual reports of the state boards of education showing reasons for withdrawal (transfer, disability, etc.) and type of current activities pursued by the public school graduate, whether these be employment, unemployment, further study or marriage.

Planners should also attempt to gather drop-out and follow-up data by target population (disadvantaged, handicapped, etc.) from the above sources or arrange to have the data made available if this information is not currently provided.

Training Output Information From the Private Sector

The educational planner may find that information on enrollments and completions comparable to the data from the public schools are not readily available from the private sector (proprietary schools, hospitals, institutions, union apprenticeship and other types of licensed training agencies.) A short phone survey of these other sources of training in the local area may prove fruitful as a stop-gap measure until more formal data-gathering arrangements can be made. In our example, a study by the local chamber of commerce listed the various schools that offer vocational education courses in the SMSA. Using this list as a guide, inquiries were made by mail and telephone which yielded the necessary information. Lists of schools offering vocational training for specific occupations in states and local areas may also be requested from the national organizations shown in the summary of sources below and additional sources of information are identified in the Occupational Outlook Handbook.

Occupation	Possible source of information
Practical nurses; attendants, hospital; nurses, associate degree	Private hospitals with special training programs; Professional organizations - National Association for Practical Nurse Education Services, Inc., New York, tel. 212-868-0220; American Nurses Association, New York, tel. 212-JU2-7230; National League for Nursing, New York, tel. 212-582-1022
Medical & dental technicians	Board of Schools of Medical Technology, Amercian Society of Clinical Pathologists, Chicago, tel. 321-738-1336; American Association of Dental Schools, Chicago, tel. 312-WH4-5878

Occupation	Possible Source of Information
Managers; sales workers	Large companies with formal training programs; Universities-colleges or schools of business administration
Secretaries, stenographers, typist	Business and proprietary schools; local secretarial associations
Carpenters	Local unions with apprenticeship programs

Chapter 6

METHODOLOGY

1. Making Projections

Developing initial occupational projections for a state or local area using the Bureau of Labor Statistics national industry-occupational matrices. There are two methods of projecting manpower requirements by occupation for states and local areas using National industry-occupational matrices recently developed by the Bureau of Labor Statistics (1). These methods assume a similarity of local area and National social and economic trends based on the fact that 1) area industry employment changes are reflected in National industry employment levels and 2) homogeneity of demand for both products and services from one area to the next (e.g., food, telephone service, and auto repairs) creates similar structures of local area industries all over the nation. A brief description of the first procedure, Method A, follows in Illustrative Table 9. This method may be repeated for as many occupations as needed, provided 1) projections by industries data is available, 2) these occupations are included in the National matrices and 3) basic employment data is available in the 1960 Census.

Method B, as presented in Illustrative Table 10, is more complex than Method A since it requires a base matrix for 1960 (see step 4) as well as the development of individual matrices for each industry. The choice of method on the basis of expedience, data and resource availability, however, is left to the planner.

Projections by extrapolation. Deriving trend projections is relatively simple and requires actual data for two year points in time (preferably five years apart) for the calculation. This is done through 1) extrapolation by simple proportion and 2) extrapolation using growth rates or factors (2). The results of these two methods are close and either may be used to obtain the needed estimates.

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(1) See *Tomorrow's Manpower Needs*, Vol. I, *op. cit.*, p. 10-17.

(2) These are available in *Growth Factors, Compound Interest Tables*, Stanford Research Institute, Research Information Center, California, which provides average rates of growth, both positive and negative, over time from 1 to 50 years.

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Illustrative Table 9

Method A. Projecting Employment by Occupation for a Local Area Using National and State Industry Trends

For Occupation N:

	(1)	(2)	(3)	(4)	(5)	(6)
Industry (each industry employing workers in occupation N)	State 1960 employment for each industry (data for area available from the Census*)	For each industry: percent of total 1960 National employment in occupation N (percents available from Appendix G, Volume IV, *Tomorrow's Manpower Needs*)	Column 1 x Column 2 (summation of column 3 = 1960 total State employment for occupation N)	1975 projected industry employment in State (projected by either time trend or regression techniques. See Part II, p. 38 for possible sources)	For each industry: percent of total 1975 National employment in occupation N (percents available from Appendix G, Volume IV, *Tomorrow's Manpower Needs*)	Column 4 x Column 5 (summation of column = 1975 total State employment for occupation, called Total 2)

$$\frac{\text{Total 2}}{\text{Total 1}} \times \text{1960 occupation N employment in local area} = \text{1975 projected employment for occupation N in local area}$$

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* "Detailed Characteristics," Characteristics of the Population, *1960 Census of Population*, U.S. Bureau of the Census, Series PC 1 (1) Volume 11 D to 53 D Chapter D, Table 125. These are individual reports, one for each of the 50 States and U.S. territories. For more detail on this source, see the description of employment by detailed occupation by sex, page 43.

Illustrative Table 10

Method B. Projecting Employment by Industry for a Local Area Using National and State Industry Trends

For Industry N:

Occupation (Distribution of occupations from professional to service workers)	(1) 1960 National ratios of each occupation in industry N (percents available from Appendix G, Volume IV, *Tomorrow's Manpower Needs*)	(2) 1975 National ratios of each occupation in industry N (available from same source as 1960 ratios)	(3) National change factors or $\frac{\text{column 2}}{\text{column 1}}$ (available from Appendix I, Volume IV, *Tomorrow's Manpower Needs*)	(4) 1960 local industry pattern (local employment in each occupation taken as percent of total local industry N employment*)	(5) Derived 1975 local industry pattern (column 3 x column 4 = 1975 local occupational ratios for industry N)	(6) Projected 1975 local employment in industry N for each occupation (1975 local occupational ratios for industry N from column 5 x 1975 local projected employment** for industry N)

The sum total of all 1975 local estimates for each occupation from column 6 in each of the industry matrices is the projected local employment requirement for the occupation in 1975.

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* *Ibid.* Table 121, "Detailed occupation of the employed."

** Projected by either time trend or regression techniques and may be available from state planning department studies. See Part II, p. A-8 for possible sources.

Method (1) derives trends by applying the change between the two given historical data proportionately over time to the year projected. The following example demonstrates how this method was used in projecting the educational indicators in our sample city. Similar projections for employment by industry and occupation may also be derived in this manner, provided historical data for two given years is available.

Educational indicator	Number enrolled			
	1963 (a)	1968 (b)	1970 (c)	1975 (d)
Secondary public school enrollments	312,042	361,309		

where

c and d = projections for 1970 and 1975

a and b = actual data for two given years

y = year

and

$$c = \left(\frac{b-a}{y_b - y_a}\right)\left(y_c - y_b\right) + b$$

thus

$$c = \left(\frac{361,309 - 312,042}{1968-1963}\right)(1970 - 1968) + 361,309$$

$$= 19,706 + 361,309$$

$$= 381,016$$

Method (2) derives trend projections by applying the rate of change between two given data points to the base year data by using the Growth Factors Table.(3) Using the data in the previous example, we divided the 1968 enrollment into the 1963 enrollment:

$$\frac{361,309}{312,042} = 1.1578$$ (rate of change in indicator over the five year period, 1963 - 1968)

The nearest approximate to the derived rate of change of 1.1578 should be located in the five-year row of the Growth Factors Table, the time lapse in the considered interval being five years. This number or 1.1593 is under the 3.0% column on page eight of the Table. Proceeding down the same column to the "seven-year" row since seven years is the time lapse between 1963 and 1970, will indicate a ratio of 1.2299. This ratio when applied to the 1963 enrollment (the base year) will give the

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(3) Growth Factors, op. cit.

1970 trend projection:

$$c = 1.2299 \times 312{,}042 = 383{,}780$$

The same methods (1) and (2) may be used to derive d, the 1975 projection. It is also suggested that these methods may be used to estimate the indicator for years within the considered time interval, 1965 enrollment for example, where no actual data is available.

2. Deriving Average Annual Job Openings

The number of job openings or entry opportunities for a given occupation within a time period is calculated as a sum of (1) employment growth or change in employment in the occupation within the considered time interval and (2) attrition or replacement demand arising from death and retirement within the occupation. A sample calculation for carpenters is presented:

Occupation	Number employed in SMSA, 1970	1980
Carpenters	7,797	8,022

(1) Employment growth $= 8{,}022 - 7{,}797 = 225$

Average employment growth = Employment growth ÷ number of years within the time period

$$= \frac{225}{10} = 22.5$$

(2) Replacement demand = average employment x annual attrition rate*

$$= \frac{8{,}022 + 7{,}797}{2} \text{ or } 7{,}909\ (2.3) = 182$$

(3) Average annual job openings, 1975 = Employment growth + replacement demand $= 22 + 182 = 204$

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* Annual death and retirement rates for all major occupational groups and categories are available in Appendix A, Volume I, Tomorrow's Manpower Needs, pp. 64-67.

In some occupations, attrition rates are provided separately for males and females. Replacement demand should therefore be calculated as a sum of both male and female attrition. The following calculation is an example:

Occupation	Number employed in SMSA, 1970	1980
Attendants, hospital and other institutions	7,897	12,351

(1) Employment growth = 12,351 - 7,897 = 4,454
Average employment growth = $\frac{4,454}{10}$ = 445

(2) Replacement demand = - average employment x attrition rate

Note: The average employment should be disaggregated by the percentage of male and female employment in the occupation in 1970.(4) If either group is less than 10%, only the rate of the larger group will be used to calculate replacement demand.

Thus,

Average employment x percent of males in occupation =

10, 124 x 24.6 = 2,490

Average employment x percent of females in occupation =

10,124 x 75.4 = 7,633

The disaggregated average employment is now respectively multiplied by the male and female attrition rates:

2,490 x 1.7 (male attrition rate) = 42

7,633 x 4.7 (female attrition rate) = 359

Total replacement demand = 42 + 359 = 401

(3) Average annual job openings, 1975 = employment growth + total replacement demand = 445 + 401 = 846

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(4) Employment by specific occupation by sex will be available in the 1970 Census. In this example, the percentages of male and female employment for the occupation were derived from the ratio of male-female employment for the occupation in the 1960 Census and updated by male-female employment ratios for the SMSA in 1970 from the State Department planning study.

3. Relating Average Annual Job Openings to Enrollments and Completions Data

Tabulating enrollments and completions data by OE Instructional Program Code. All vocational instructional program offerings in public schools are now classified by subject matter and assigned numberical codes up to six digits for standard identification and classification purposes. (5)

The seven main subject matter areas with their corresponding identification codes and sample instructional programs are as follows:

Instructional program	Assigned OE program code
Agriculture	01.00
Animal science	01.0101
Distributive education	04.00
Industrial marketing	04.12
Health occupations education	07.00
Nursing assistance (aide)	07.0303
Home economics	09.00
Consumer education	09.0104
Office occupations	14.00
Stenographic, secretarial and related occupations	14.07
Technical education	16.00
Electronic technology	16.0108
Trade and industrial occupations	17.00
Carpentry	17.1001

Thus, each instructional program carries the first two digits of its major subject matter area plus four subsequent digits designating it as either a principal segment of training in this area or a division classified under the principal segment. The instructional program "Nursing assistance (aide)" for example, carries as its first two digits "07." , the health occupations education code, plus "0303" signifying this program as the third division classified under "Nursing", the third principal segment of the health instructional area. In addition, each instructional program is briefly described according to curricular content. The "nursing assistance (aide)" program is defined as a "combination of subject matter and experiences designed to prepare a person to perform simple tasks involved in the personal care of individuals receiving nursing services. These tasks are performed under the supervision of a nurse."

Using the handbook, vocational education program offerings in an educational system can be similarly classified and their enrollments and completions tabulated by this classification.

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(5) See the handbook, Vocational Education and Occupations, prepared jointly by the Division of Vocational and Technical Education, Bureau of Adult Vocational, and Library Programs, U.S. Office of Education and the Bra of Occupational Analysis, U.S. Training and Employment Service, Manpower Administration, U.S. Department of Labor, 1969.

Matching instructional programs to related occupations. In order to help facilitate the matching of instructional programs to occupations, the handbook also indicates opposite each instructional program the occupations directly related to it. These occupations are defined, classified, and numerically coded by the D.O.T. system.(6) In cases where an instructional program is matched to a specific occupational title as in "07.0101 Dental assisting" matched to "Dental assistant (medical service)," relating instructional programs to occupations is simple.

BLS Occupational Category	Federally-funded Instruction Program	
	OE code	Title
Dental assistants	07.0101	Dental assisting

However, in some cases, more than one occupational title is related to an instructional program. The instructional program "Nursing assistance (aide)" for instance is related to three D.O.T. occupational titles and "17.1001 carpentry" is related to 29 occupational titles. Since the purpose here is to identify the occupational category or group for which data are available and relate it to the instructional program, it will be necessary to convert the DOT titles to the same classification as the data source. Where BLS data are used, the first digits of the related D.O.T. titles should provide the clue to their BLS occupational group and classification. For this purpose, the BLS Conversion Table should prove very useful in identifying the occupational group or category.(7)

First, the handbook shows that the numbers "355" is common to all D.O.T. titles related to the "07.0303 Nursing assistance (aide)" program and "860" is common to all D.O.T. titles related to the "17.1001 Carpentry" program. Consulting the Conversion Table, one would find that the "355." D.O.T. title group, Attendants, hospitals, morgues and related services is equivalent to the BLS Occupational Category of "Attendants, hospitals and other institutions." In turn, the D.O.T. title group "860. Carpenters and related occupations" is equivalent to the BLS Occupational Category of "carpenters."

BLS Occupational Category	Federally-funded Instruction Program	
	OE code	Title
Attendants, hospitals and other institutions	07.0303	Nursing assistance (aide)
Carpenters	17.1001	Carpentry

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(6) See p. xi of the handbook, Vocational Education and Occupations for a brief explanation of this classification or consult the Dictionary of Occupational Titles, Third Edition, Vol. 1.

(7) See the Table Conversion from BLS Occupation Group and Major Occupations to D.O.T. Equivalents, Bureau of Labor Statistics, U.S. Department of Labor (unpublished).

The case entailing the most difficulty in matching instructional programs and occupations would be where instructional programs are so broad that they train or relate to several instructional categories. An example would be in the program "04.19 Transportation," where a wide variety of D.O.T. titles equivalent to several occupational groups and categories, i.e. managers, salesworkers, clerks, and stewardessess is related to this program. The difficulty lies in relating these occupations to one instructional program particularly if enrollments and completion data are reported for the whole program and not by groups, that is, how many enrolled or completed training as managers, sales workers, etc.

If more detailed statistics cannot be obtained, qualitative judgement should be exercised in choosing the occupational group the instructional program is mainly training for. If for instance only a negligible number of managers and clerks are being trained in this program, it could then be related in terms of enrollments and completions to sales workers, n.e.c. or stewardesses as the case may be.

	Federally-funded Instructional Program	
BLS Occupational Category	OE Code	Title
Sales workers, n.e.c. (8) or Stewardesses	04.19	Transportation

Relating average annual job openings to completions in instructional programs. After classifying program offerings by OE code classification and relating them to occupational categories, data on average annual job openings for each occupation as well as data on enrollments and completions may be filled in so that ratios of completions to job openings could be obtained.

Table 11 summarizes this procedure for one occupation, carpenter. The steps are as follows:

1.) Enter the occupational title;

2.) Record annual job openings for 1970 and 1975 and percent change (for duration see pp. 58-59);

3.) Enter the appropriate instructional program code and title;

4.) Record enrollments and completions from this program for current year;

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(8) The BLS Conversion Table equates the D.O.T. title group, "280. Salesman..." in the OE Transportation instructional program to the occupational category, "Sales workers, n.e.c. (not elsewhere classified)".

5.) State completions in 1970 as a percent of average annual job openings for 1970;

6.) Identify source(s) of formal occupational preparation other than vocational education;

7.) Record total enrollments and completions from these source(s) for current year;

8.) State "other source" completions as percent of openings;

9.) Calculate total completions as a percent of openings.

Illustrative Table 11

Average Annual Job Openings Related to Training Completions from the Public and Private Sector for the Baltimore SMSA, 1970 and 1975

(1)	(2) Average annual job openings,			(3) Federally-funded instructional program	
Occupational category	1970	1975	% of change	OE Code	Title
Carpenters	208	204	-2%	17.1001	Carpentry

(4a) Number of Enrollments	(4b) Number of Completions	(5) Completions as a percent of average annual job openings, 1970 (Col 4b ÷ Col 2)	(6) Type and source of training, private sector
100	54	26%	Apprenticeship program

(7a) Enrollments	(7b) Completions	(8) Completions from other sources as a percent of annual job openings, 1970 (Col 7b ÷ Col 2)	(9) Total completions (public and private) as a percent of annual job openings, 1970 (Col 4b + Col 7b ÷ Col 2)
180	170	83%	108%

APPENDICES

APPENDIX I

COORDINATING STATE AND LOCAL VOCATIONAL EDUCATION PLANS

by

Paul Larkin

BACKGROUND

This paper is intended to assist state planners in relating local plans to the state vocational education plan. It presents some simple methods for appraising the reasonableness of local vocational education decisions in light of local manpower and demographic projections. Implications are drawn for procedures needed to facilitate the flow of planning information from the state and local to the national level.

This report is an outgrowth of a continuing effort of the National Planning Association to identify national goals, estimate their dollar costs, and indicate the manpower needed to achieve objectives. One past effort explored the implications of national goals for planning priorities in vocational education. The present paper is part of a more recent study, under a grant from the Bureau of Research of the U. S. Office of Education, devoted to the development of a planning guide for vocational education at the local level and is also based in part on observations and experience associated with earlier efforts.

Documents reviewed in preparing this paper include planning documents of more than three-fifths of the states, many local plans and their numerous supporting documents, and scholarly analytical studies concerned with vocational program planning. Information also was obtained from information users and developers in research coordinating units, city systems, and community college offices of institutional research and state level people responsible for vocational education planning.

A. OVERVIEW

The Vocational Education Amendments of 1968 provide for a kind of planning that links statistical information concerning students with projected job opportunities in the five-year future. Questions arise concerning the compatibility of data derived from a variety of souces, the various ways that data can be processed and analyzed for planning purposes, and the wealth of ways that percentages and ratios can be used to express planning relationships all of which contribute to the problems of coordinating local information at the state level.

The problems of coordinating local planning information will not be the same for all types of data. In the discussion which follows, occupational outlook information will be seen to involve centralized sources of projections, with communication problems between the makers of projections on the one hand and the users of projections on the other posing some of the key difficulties of coordination. Manpower supply information, however, will be seen to suffer from a dearth of systematic observations made at the local level. Demographic and socio-economic statistics will be seen to involve a jungle of different sources, often resulting in a hodgepodge of disparate information to be reconciled for meaning and worth.

From this picture we have drawn conclusions and recommendations concerning further federal and state guidelines necessary for the coordination of local planning information. Procedures should be provided for routine annual business meetings between local planners of vocational programs and employment security officers who are the source of locally relevant manpower projections. Manpower supply estimates should be gathered annually on a local basis. And finally, coordination of target information must be accomplished if state plans are to be fulfilled in the aggregate at the local level, the practical level of program implementation.

B. STATEMENT OF THE DATA COORDINATION PROBLEM

As a result of the program planning requirement of the Vocational Education Amendments of 1968, all state vocational education agencies must now coordinate and analyze new kinds of quantitative information including data outside the usual domain of education. Beginning in fiscal year 1971 federal regulations will require that each state plan include an application form to be used by local education agencies requesting federal funds. These local applications must:

1. Describe the programs and activities for which federal funds are requested;
2. Give evidence that existing manpower supply resources are being considered;
3. Show how the vocational programs proposed will prepare individuals for careers;
4. Present a five-year plan, compatible with the two-year projections of CAMPS*, reflecting the vocational needs of local students, and;
5. Relate program information to the local objectives identified.

Incorporating local information into the state plan is now, therefore, a more complex task than ever.

This paper describes the problems the state agencies face if they are going to integrate quantified local planning information with the state plan for vocational education. Techniques are discussed for appraising the reasonableness of manpower and demographic projections in the local plans, and for translating these projections in the local plans into indicators for educational planning. We shall also consider state and local target-setting, the pressures for more information and new information and new information within the state's vocational education system, and the problems involved in coordinating intra-state target objectives for special categories of students such as the disadvantaged.

Several rounds of planning experience to date indicate considerable variety in local plan submissions, within the limits of federal regulations.

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* Cooperative Area Manpower Planning System.

One state, for example, has a comprehensive system for determining occupational supply and demand for each locality relieving the local education agencies of this responsibility. Both employers and non-public sources of training are surveyed annually, insuring accurate and up-to-date information. An immediately adjoining state, however, only makes the estimate of local occupational opportunity. Each locality is required to submit the basic manpower supply information needed for the state plan. In many states, however, even general estimates of manpower supply are omitted by the local agencies and in most states little or no information is reported on manpower supply from the proprietary schools.

Variations in local objectives, assumptions, definitions, sources of information used, and values assigned to the same projections by different sources are some of the problems which may affect state coordination of local information. The sections which follow will discuss such problems in detail.

A review of local application forms contained in state plans reveals program planning information that can be classified into three major categories: occupational demand and manpower supply, demographic and socio-economic data, and instructional program data. It will be convenient to discuss the coordinating of state and local planning information in terms of these major information categories.

C. COORDINATING STATE AND LOCAL PLANNING INFORMATION

Demand Information. A state's occupational outlook information is usually centrally coordinated, most often by the state department of employment security. Special studies by public agencies, outside consultants, or local banks or Chambers of Commerce have also been occasional sources of data on future occupational demand. The federally supported employment service frequently makes annual projections of occupational demands. The Vocational Education Amendments of 1968 envisioned an expanded role for the state and local employment services in identifying occupational outlook. An increasingly strong national federation of state information systems is forseeable in the decade of the seventies.

To be useful for vocational education planning, however, projected job opportunities data must be specific enough to permit translation into the United States Office of Education standard instructional program code.* In many states this is now difficult. Certain localities, for example, continue to report job opportunities in the old general categories, such as "Trades and Industrial" or "Distributive Occupations." In our larger population centers, however, job opportunities are now being projected in sufficient occupational detail to permit analysis in terms of instructional programs. In the first round of planning under the '68 Amendments, there was little uniformity in reporting local job opportunities. Confusion among the indicators used created problems of data coordination. Because of growing state and local cooperation, however, this lack of uniformity is declining. Since 1968, the Labor Department's Manpower Administration has continued to refine procedures for annual reporting of state and local manpower projections.

When occupational opportunities are sufficiently detailed to specify instructional programs, data can be translated into information for coordinated vocational program planning. Lists can be drawn up, for example, showing which occupations show increasing, constant, or decreasing job opportunities in a state, and in each of its school district areas. Job categories can also be listed showing critical shortages of trained workers.

If a state and any of its subdivisions have relied upon different sources in projecting job opportunities by occupation, a check is necessary to ascertain the compatibility of the sources, since assumptions and techniques may vary. For example, those responsible for drawing up the vocational education plan at the state level may have relied upon state planning department forecasts drawn up in the mid-1960's, which depended upon earlier data. Projections for one of the state's metropolitan areas, however, may have been made more recently, using new techniques of the Bureau of Labor Statistics and involving slightly different assumptions. The information in the state report, emphasizing employment by industry, therefore, may not be directly comparable with the occupational outlook reported for a specific metropolitan area. Clearly a more unified procedure for coordination is needed. State employment service projections covering the entire state not just the metropolitan area alone would be a solution.

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* See Vocational Education and Occupations, OE-80061, U.S. Government Printing Office, Washington, D.C., 1969

If state and local sources of manpower projections differ, some simple techniques may help state people to assess the reasonableness of the local forecasts. Table 1, adapted from an actual report of a state employment service, illustrates the use of the city-to-state ratio to coordinate state and local occupational outlook in health occupations for the five-year future. In this example, local projections of occupational opportunity are compared with the state estimates for the same future year as a check for compatibility. Projections are listed for eight health occupations in a moderately large state and one of its cities. The city has a population of about half a million, a little more than 10 percent of the state population. In the projections given in Table 1, however, something closer to 20 percent of the total state employment opportunities in three occupations listed are assigned to this one city: dental assistants, medical technicians, and licensed practical nurses. Moreover, while psychiatric aides figure as the second highest category for job opportunities in the state, no opportunities in this category are reported for the city. Translating city projections into percentages of the state total can facilitate the identification of such relationships, and suspicious items can be checked for reasonableness.

Where state and local data relationships seem unusual or out of the ordinary, it is proper to ask why. There may be some common explanation of discrepancies or anomalies, or each may have its own unique explanation. Modest inquiry will usually reveal some answers. In the case of the health occupations shown in Table 1, there may be a concentration of dental as assistants and medical technicians in the city because of the density of service facilities there, and the high demand for licensed practical nurses may occur because of a high density of urban nursing homes. The failure to list opportunities for psychiatric aides, however, is probably a reporting problem. Data may never have been collected for this occupation on the basis of simple inertia, or because it had never yet been identified separately by the employment service and reported as an occupational opportunity to vocational educators.

TABLE 1

Using the city to state ratio of job opportunities to assess the reasonableness of local five-year projections (Needs for health services proportionate to the population is taken to be a criterion. The city holds about one-tenth the population of the state.)

OCCUPATION	Five-year State Projection	Five-year City Projection	Ratio of City Projection to State Projection	Comment
Dental assistant	125	25	.20	Exceeds expected value. Should be checked.
Medical lab. assistant	100	15	.15	
Medical technician	90	15	.17	Check for reasonableness.
Nurses' aide	475	35	.07	
Nurse, licensed practical	565	110	.19	Check for reasonableness.
Nurse, practical	350	30	.09	
Orderly	310	20	.06	
Pyschiatric aide	465	*	.00	

* Omitted (no projection given)

SOURCE: Annual report of the state employment service.

Supply Information. Intimately connected with occupational demand projections is the forecasting of changes in the new supply of skilled manpower at the state and local levels. In most states the supply of skilled manpower trained in proprietary schools, business and industry, or other private sources is not being systematically monitored, However, state licensing of proprietary schools may offer an opportunity to obtain such data in the future. While periodic surveys are generally conducted among employers, often on a yearly basis, to determine industry's needs for manpower in places of any considerable population density, no counterpart effort is usually made on the supply side. Lack of observations or estimates locally results in a lack of factually based estimates at the state level.

Currently, dependable estimates of future manpower supply tend to be limited to public local, state or federal sources of job preparation. In most instances, however, the reporting of historical data from even the public sector cannot be called adequate. Manpower supply is therefore a critical area of information need in the vocational program planning system.

Relationships between projected occupational demand and state and local manpower supply are brought out by the illustrative data on Table 2. It is assumed that information from public sources is the only informationn available. Ratios of state supply and city supply to projected demand are used to bring out planning information relationships. The state and city are the same ones used in Table 1. In the example, a problem arises in the case of the practical nurse category. Here the state supply is listed at over 100 percent of demand, and the city supply is over 200 percent of demand. It may be, however, that the practical nurse category is being used as a catch-all for classifying many persons expected to become nurse's aides or assistants, licensed practical nurses, pyschiatric aides, and workers in other occupations related to health disciplines. Before any decision is made, therefore, it would be necessary to determine the exact occupations included in this category.

Five-year projections of manpower supply by occupational category may be classified as target projections, and will be discussed under this heading in a later section. At this point, however, it is important to emphasize that planning coordination must be established on a firm basis, through up-to-date knowledge of manpower supply for a given occupation. Even if costs, priorities, or other considerations prohibit immediate development of a full-fledged system for anticipating occupational supply, general estimates should be obtained when the local plan is prepared. The planning technician in the state capital will not be able to contact all the sources of manpower supply in the state, but the local

TABLE 2

Using ratios of current public vocational training supply to projected occupational demand in health occupations establish the reasonableness of manpower supply information available.

OCCUPATION	Projected Demand in the State	Current supply in the state from public sources	Ratio of state public supply to projected demands	Projected demand in the city	Current forecast of supply in the city from public sources	Ratio of city public supply to demand projected
Dental asst.	125	48	.38	25	12	.48
Medical lab asst.	100	25	.25	15	3	.20
Medical tech.	90	1	.01	15	-	-
Nurse's aide	475	80	.17	35	-	-
Nurse, lic. prac.	565	30	.05	110	-	-
Nurse, practical	350	487	1.39	30	113	2.65
Orderly	310	135	.44	20	17	.85
Psychiatric aide	465	-	.00	-	-	-

SOURCE: Adapted from a recent annual report of a state employment service.

NOTE: Demand is based here on the Employment Service unfilled openings approach, and manpower supply includes secondary, post-secondary, and adult programs in the regular vocational education system, together with the results of other sources of training such as MDTA programs. Data were not available concerning results of private sources of training such as proprietary schools.

planner should find it possible to contact the major sources in his own local area.

Figures derived from general estimates, however, should not be treated the same as actual count figures. Estimates will help establish reasonableness of local targets with reference to the total supply situation but they cannot be unthinkingly aggregated as a reliable version of the state picture.

Demographic Information. Information concerning future students and their communities helps determine the type and scope of alternative program offerings for the five-year future. Secondary enrollees of five years from now have already been in school for some time, and we can describe their numbers, ethnic and geographic origin, levels of family income and degree of handicap if any. We can also generalize about communities through the use of indicators such as juvenile delinquency rates and high school dropout rates. In addition to basic information concerning population by age, sex, and ethnic group, a number of other indicators are used in local plans to specify target groups. Some examples of indicators used are number of low income families (or children of low income families), number of handicapped, dropout rates, unemployment rates and juvenile delinquency rates. Any one of these indicators may entail information problems.

Census counts are a major source of demographic information for vocational program planning purposes. In addition to information on school enrollments and years of school completed, census reports provide information on a number of other variables: birth and death rates, migration patterns, measures of family stability, employment status, nativity and parentage, occupational distributions, income, population changes, urban-rural differences, age and sex differences, distribution of population subgroups, and long-term historical trends.

With the passage of time following the decennial Census, it becomes increasingly necessary to use a number of other more recent sources of data describing the population. The reliability of information about state and local residents can vary considerably, depending upon differences in source, purpose, recency and data base. Table 3 illustrates four estimates of the 1975 population of a sample city made in the late 1960's. All accepted the data of the 1960 Census as a starting point. A state planning department, relying upon projected natural population increase and net migration, forecast a city population of over 948,000 in 1975. The most recent available evidence used in this study was from the mid-1960's, and the objective was to forecast economy and labor force as a basis for state policy decisions. Three later studies relied on subsequent data and aimed at fulfilling different purposes. A university study (supported by the U.S. Department of Commerce) concentrated on economic outlook by county. An educational study added current population reports of the census bureau to the data base. The closest monitoring of recent data was that of state vital statistics agency, and its estimate, 892,000, was the low one, most in keeping the the Series I-B population estimates of the Census Bureau. This was the series sensitive to reduced fertility rates beginning in the latter half of the fifties.

Other data sources are also used. For determining the number of children in low income families many auxiliary sources of information have been used in local plans. They include welfare and impact aid programs, as well as health, employment, and housing statistics. Because poverty may be defined differently from one source of information to the next, it is the responsibility of the data coordinating agent, at the state level, to insure that items of information reported are compatible.

TABLE 3

Estimates of the 1975 population of one city according to four different sources in the late 1960's illustrate the problems involved in comparing subgroup estimates from one data base to another.

SOURCE AND DATE OF PUBLICATION	PROJECTED POPULATION OF THE CITY FOR 1975
State Planning Department, 1967	948,500
State and County Projections, U. of Maryland, 1969	927,800
U. S. Office of Education Study, 1969	912,000
State Health Department, Vital Statistics Division, 1969	892,000

Table 4 illustrates how information on geographical trends in population characteristics might be organized to bring out planning relationships, as a basis for coordinating information drawn from many sources. Rates of change help show these relationships over a five-year planning period. The data in Table 4 demonstrate that the "rest of the state" will be growing to roughly four times the population size of the sample city in a five-year interval. The city population is seen to be relatively static. While the total state shows notable gains in selected population age groups of special interest for vocational planning, the city tends to show stability or decline. This implies that the "rest of the state" may have more flexibility in planning and in developing new responses to expanding demand for occupational education. Program changes in the city will tend to reflect replacement of old programs, or a reordering of program priorities within a relatively constant total. The same pie in the city must be cut different ways, while the expanding pie in the rest of the state permits more chances to start new things afresh.

TABLE 4

POPULATION CHARACTERISTICS

	1960	1970	1975	Percentage Change, 1970-1975
General Population				
State Total	3,100,689	3,969,200	4,528,000	14.0%
City	939,024	928,800	927,800	-0.1

Source: C. Harris, Jr., State and County Projections, University of Maryland, 1969.

	1960	1970	1975	Percentage Change, 1970-1975
Percent of Population in Selected Age Groups				
State:				
15-19	279,000	361,000	412,000	14.0%
20-44	1,070,000	1,310,000	1,585,000	20.9
City:				
15-19	65,000	81,000	83,000	2.2
20-44	309,000	276,000	283,000	2.5

Source: State Planning Department, The Population of the State, 1967 and C. Harris, Jr., State and County Projections, University of Maryland, 1969.

Table 5 selects some indicators of disability to bring out another problem of coordinating planning information. This problem concerns a category of disability under the heading "Unable to carry on major activity." While state and city growth of population with limited disability can be said to be reasonably comparable in Table 5, there is a notable difference in the gains projected for the more handicapped. The city change rate is 40 percent in contrast with the state rate of 9 percent. The planning coordinator must ask why. He should look for explanations in terms of data or in terms of fact. The answer may lie in a change of definition, or in more sensitive procedures for identifying the serverely disabled, or in the establishment or a special institution within the city. Coordinating the information implies that the why of discrepancies will be determined.

TABLE 5

Illustration of a Problem Concerning Indicators of Disability in a State and One of Its Cities for the Five-year Future: An Unaccounted for Gain in the Number of Severely Handicapped is Projected for the City.

Population which is Disabled (a)	Total	Limited in amt. or kind of major activity	Unable to carry on major activity	Total	Limited in amt. or kind of major activity	Unable to carry on major activity	Total	Limit	Unable
State	315,182	232,031	83,151	362,818	272,114	90,704	15%	17%	9%
City	94,600	69,700	24,900	119,237	84,337	34,900	25	21	40

(a) Governors Study Group on Vocational Rehabilitation, Vol. 2, p. 72, 1968.

Certain other indicators of disadvantage of handicap will be discussed in connection with data coordination within the educational system. This will now be our topic in the section which follows.

Coordinating School System Data. Information originating in the state's educational system will pose some of the toughest data problems for the vocational information coordinator.

For the sake of emphasizing these outstanding problem areas, we will structure our present discussion around data on poor and handicapped students, and selected program completions data designed to support target projections. Target projections themselves will be discussed later. It is recognized that many other variables could have been introduced to illustrate data coordination needed within the school system, beyond those selected in this presentation. The principles of evaluation are similar, however, to those we apply here.

A kind of observation frequently heard from vocational educators is that "we have been serving the disadvantaged student for years, but we have never had to identify them. I probably have fifty disadvantaged students in my classes right now. But I can't tell you which students they are." This raises the question of indicators, or how you design special programs for students you can't identify.

When leadership to provide for human needs emanates from the federal and the state level to the local level where programs are implemented, the bias is strong to identify student needs within statistical categories of disadvantage. Infinitely more promising, however, is that approach whereby local agents understand that they have a mandate, and feel free to begin with the numbers and types of individual students who are "not succeeding" in regular programs. The school dropout, the unemployed youth, and the juvenile delinquent and the low achiever are examples of those not succeeding. These descriptors can become indicators, together with items in the student's school record which predict school withdrawal, unemployment, and juvenile delinquency. Such indicators should be pulled together in planning local programs for the disadvantaged, not excluding an important type of predictor often neglected in recent years: the paper and pencil test of aptitude and achievement.

Table 6 illustrates the use of ratios for the assessment of state and local relationships concerning the enrollment of disadvantaged students in vocational programs. When the data of a major city are related to the state data for a current year, the city effort can be seen as a proportion of the state effort within instructional programs. Special efforts for the disadvantaged are expressed as a function of instructional programs. Several specific occupations are presented for illustration in Table 6. The table shows that cooperative and work-study programs are being utilized to train the city's disadvantaged students. Within the occupations selected as examples, the disadvantaged are being prepared as auto mechanics but not as medical and dental technicians. The city claims about a third of the state's total enrollment in cooperative programs; and about two-thirds of its enrollment in work-study programs. Relationships like this

TABLE 6

Using Ratios to Evaluate Selected Enrollment Patterns for Regular and Disadvantaged Students in Vocational Education in a State and Its Major City, 1970

	INSTRUCTIONAL PROGRAM	Regular Programs	Special for the Disadvantaged		Total
			Coop	Work Study	
CITY	Total (Gainful)	13,400	1100	500	15000
	Medical and Dental Technicians	50	-----	----	50
	Auto Mechanics	250	50	250	550
STATE	Total (Gainful)	25,300	3600	800	29700
	Medical & Dental Technicians	100	-----	---	100
	Auto Mechanics	1200	100	500	1800
City-to-state RATIO	Total (Gainful)	.53	.31	.63	.51
	Medical and Dental Technicians	.50	-----	-----	.50
	Auto Mechanics	.21	.50	.50	.31

permit the information coordinator to assess the meaning of the data he is receiving from the city for policy implications within the total state program.

Percentages may also be used to contrast the city and state patterns of enrollment of the disadvantaged as a percent of the whole (regular and disadvantaged combined.) This can be done for the total vocational education effort and for each occupational category. The entries in Table 6 do not appear to demonstrate inconsistency or incompatibility, as about the same percentage of special effort for the disadvantaged is seen in the city and the state as a whole.

Typically, the information-gathering resources available to vocational educators are not yet up to the challenge of producing uniformly acceptable data for identifying disadvantaged vocational students. One approach obtains program enrollment information from all students, beginning at the junior high school level, thus providing the necessary data for planning. Another solution relies upon advertising and the sign-up process, so that only students manifesting a need are recruited. If such solutions are attempted, for program planning and budgeting purposes descriptors like "poverty" should be more and more specifically defined from the national through the state to the local level. Moreover, requests for information from the local planning agent should be accompanied by advice, standardized definitions of terms and resources enabling him to gather the information he must report.

The strategic position of state departments of vocational education makes them responsible for coordinating information on state and local instructional programs. It is up to them to provide the technical assistance necessary for effective program planning on a statewide basis. This implies appropriate record-keeping procedures, reporting forms, and timetables for data collection, as well as the guidance and training of local school personnel through conferences, written guidelines, and direct assistance as needed.

It would be foolish to draw up a comprehensive list of items of information that would apply in the same way to vocational program planning in every state.

However, enrollments and completions data by occupational program are at the heart of program planning for vocational education. Logically, reports of training completions by occupational category are the minimum information elements necessary for effective communication and program management. It is more common, however, for enrollments to be reported rather than completions when only one of these two reporting categories is used. If there can be established a clear relationship between enrollments and completions estimates of current occupational supply from public vocational education can be made. But this is a stopgap measure. Where completions are not now being reported by occupational category, their reporting should be initiated promptly, and a beginning should be made in collecting placement and follow-up information.

Information on enrollments and completions will generally show some degree of internal consistency within a given school system, if standards and practices are uniform from one school to the next. This is not necessarily the case, however, as we move from secondary to postsecondary levels of education. Community colleges, with strong programs of occupational education developing independently of vocational education at the secondary level, represent a segment of state and local vocational training which in most instances has not evolved into an integrated element of the state's total vocational education effort, or been incorporated in their reporting procedures.

This concludes the section on coordinating school system information for vocational education planning at the state and local level. We will now turn our attention to the way information is used to establish priority alternatives, and ultimately program priorities, within the state.

D. COORDINATING TARGETS

Coordinating state and local targets is an aspect of planning that can easily be overlooked. The assumption may be made that local agencies plan independently, but a state appeal for practical nurses, for example, could bring a local response that oversupplies the need and does a disservice to the students. Because of the importance of coordinating target information so that state plans will be practical as well as rational, special attention must be paid to the cumulation of local plans into the state plan.

The information analyst at the state level can be aided by the use of ratios to coordinate targets of a major locality and the remainder of the state. This type of information relationship is illustrated for one occupation, medical and dental technicians, in Table 7. In this example, the city to state ratio of opportunities and training completions is seen to be held constant for target projections in the five year future. The city thus maintains its effort in relationship to state totals. In 1975, this city's public vocational education program will continue to graduate three medical or dental technicians of every ten in the state, as in 1970, as the "demand" also remains relatively constant. Where a city has concentrations of a certain industry, steel or electronics, for example, the reasonableness of certain ratio entries will be apparent.

The utility of the ratio method is in its ability to reveal major patterns of change in activities concerned with occupational programs. Major changes can be evaluated for their reasonableness and their compatibility with what is happening elsewhere in the state. If, for example, the city effort in Table 7 had shifted from three-tenths of the state target completions for medical and dental technicians, the question of decentralization of effort could be raised to help establish alternative targets.

Much information crucial for effective planning is in the form of numerical data, but projecting realistic future possibilities also demands considerable critical judgement. Targets can be reasonably expected to demonstrate sound logic, and it should be possible to explain why some particular number or percentage was chosen as a target rather than any other. But extreme precision is not to be expected, because projections are estimates.

In practice, the planner can be reasonably asked why he projects a target change in enrollments of the handicapped from 5 percent to 10 percent in some program, rather than to 20 percent, but not why he doesn't make

TABLE 7

TO COORDINATE CITY AND STATE TARGET PROJECTIONS FOR PUBLIC VOCATIONAL EDUCATION PROGRAM COMPLETIONS

OE Program Code	Occupation	Actual Job Openings and Completions for 1970		Projected Job Opening and Completions for 1975		
		Job Openings	Completions	Estimated Job Openings	Target Completions	Comment on Target Projection
07.0103	Technicians, Medical, and Dental	CITY: 200	25	280	70	Increase percent of completions from 12.5% to 25% of job openings in response to opportuniti maintains current city to state ratio of occupational program completions.
		STATE: 670	83	940	233	
		RATIO: City to State: .30	.30	.30	.30	

it 11 percent or 9 percent. Perhaps the best reasons for target-setting will result from discussions with the people who will have to operate the program. Their estimates can be taken to be good indicators of what is feasible, and good management practice will not exclude them from target setting.

Occupationally-related courses of instruction meeting student needs through appropriate programs are at the heart of the Vocational Education Amendments of 1968. Table 8 shows how information on target populations such as the disadvantaged can be laid out to permit coordination of co-relative target programs. This procedure can help rationalize the pattern of program development intended for a state and one of its cities in the five-year future. Although this form of laying out information is useful for other purposes as well, we will focus on what it brings out concerning enrollments of the disadvantaged as a percentage of the total city and state effort by occupational category. The listing of enrollments of disadvantaged as a percent of the city and the state program by occupation, health technicians and auto mechanics are useful examples, shows that the state and local target enrollments are not unreasonable or incompatible with each other. Modest increases of the disadvantaged can be seen proportionately in the total program and in the auto mechanics program. Notice that the five-year targets do not provide for medical and dental technician training for the disadvantaged. Discussion of this possibility as an option may result from such an observation.

Target coordination between the state plan and the aggregate of local plans must also be considered. If the efforts described in the state target projections are not implemented in the aggregate of local efforts, they will not be implemented at all. The local efforts need not all be a reflection of the projected state efforts in a uniform manner. That would be most unusual, and most artificial. But the local efforts must be such that on the average, or more specifically in the aggregate, they must approximate the state plan provisions in such a way as to validate the information reported on targets in the state plan.

In many states, targets reported to the state agency by the local planning agency are now coordinated for neither instructional programs nor special subgroups of the population. This implies a fiduciary approach on the part of the state agent to local plan submissions. In other states, however, selected targets are checked in the annual plan. Vocational services projected for low-income family students provide an example of an item which might be singled out for review. A planner interviewed in one state in connection with this report stated that the rural poor in his state needed so much by way of vocational education

TABLE 8

ILLUSTRATION OF A REASONABLE SET OF SELECTED ENROLLMENT PATTERNS FOR REGULAR AND DISADVANTAGED STUDENTS IN VOCATIONAL EDUCATION, 1970 and TARGET PROJECTIONS TO 1975

	ACTUAL 1970						PROJECTED 1975							
INSTRUCTIONAL PROGRAM	Regular	Coop.	Work-Study	All Programs for Dis-advantaged	TOTAL	Disadvantaged as a Percent of the Whole	Reg.	Coop	Work-Study	All Programs for Dis-advantaged	TOTAL	Disadvantaged as a percent of the whole	Percent Increase Disadvantaged	Percent Increase Whole
Total (Gainful)	13400	1100	500	2600	15000	17%	14500	2500	1000	3600	18000	20%	38%	2
Medical and Dental Technicians	50	--	--	--	50	0%	150	--	--	--	150	0%	--	-
Auto Mechanics	250	50	250	300	550	54%	300	135	300	435	735	59%	45%	3
Total (Gainful)	25300	3600	800	4400	29700	15%	30000	4400	2000	6400	36400	18%	45%	2
Medical and Dental Technicians	100	--	--	--	100	0%	300	--	--	--	300	0%	--	20
Auto Mechanics	1200	100	500	600	1800	33%	1200	200	600	800	2000	40%	33%	1

services that no coordination of planning information was needed. Just the services in whatever abundance was available. This position represents a "greatest need" approach, but does not answer the question, how much is being done? Another state has a program planning division that systematically rationalizes local target-setting.

The results of these efforts must be scrutinized annually. Program planning is intended to be a cycle, and not a once and for all event. This means that feedback mechanisms must operate, if decision makers are to be alert to the communication resources available in PPB. Informative feedback should characterize vocational education at every state of management as the year progresses, both in the annual evaluation of plans and performance as they develop and in the broader evaluation of the longer-term effort over a period such as five or ten years.

E. CONCLUSIONS AND RECOMMENDATIONS

The successful functioning of the program planning and budgeting approach required by the 1968 Amendments depends upon the information moving from local data sources to the state capital, and to Washington and back again. The system must be competent. Much of the skepticism or reluctance to rely upon planning information comes from the disorder attached to a mountain of miscellaneous bits and pieces of uncritically used data. The system must be useful, and increasingly specific as the geographic area referred to is more tightly defined. Flexibility must be built in, so that information may flow in the same volume, form and configuration appropriate to many different types of user, from the program administrator to the vocational counselor.

The state information coordinator must understand that one of the chief problems of information gathering for the local planner is the identification of students not succeeding in regular programs. Statistical descriptions of people in a locality are sufficient to identify widespread vocational education needs, or special problems in cities and depressed rural areas.

The following recommendations are suggested by the material in this chapter, and may be useful for officials considering the further development of federal and state guidelines for planning:

1. State level coordinators of information should evaluate local target projections to determine their compatibility with the state plan, and should see if the aggregate information of local planning targets reported for the state will be substantially equivalent to local aims in the aggregate. State coordinators should be able to use simple methods, such as ratios and aggregate differences, to evaluate the reasonableness of local target information.

2. Guidelines on the use of occupational outlook information within the state should feature cooperation with the state department of employment security because of that agency's information resources, as well as the Cooperative Area Manpower Planning System (CAMPS). Such cooperative efforts should also include the state education department's resource for the dissemination of vocational guidance and counseling information.

3. Most states need a thoroughgoing system for projecting manpower supply by occupation in the five-year future. As matters now stand, even general estimates are regularly lacking as to the supply of trained manpower that can be anticipated from non-public sources of training within most of the fifty states.

4. Local planners need more knowledge and training in the use of demographic information for long-range vocational education planning. Not only should local planners have some general sense of the assumptions, methodology, recency, and value of these projections. They should also be able to use percentage distributions and percentage change comparisons as part of their routine reporting that translates data into useful planning information.

5. School system information is the area of guidelines for coordinating vocational education planning in most urgent need of attention by federal and state administrators. Files describing student characteristics relevant to programs need to be most specific at the school and district level, with decreasing specificity at the state and federal level. It should be abundently clear locally which disadvantaged and handicapped students are not succeeding in regular programs, and how they are identified. State departments of vocational education should also be receiving from local agencies a clear communication of full-time equivalent instructional courses by occupational category, and the current year's enrollment and completions data indicating the number of regular and special-category students enrolled or graduating.

6. Community colleges and post-secondary technical institutes should be singled out for development of more effective reporting of information essential for coordinated planning and evaulation. Job and career oriented completions should be reported unambiguously.

7. Target-setting should focus on students, and relate individual student needs and capacities to occupations and careers through the medium of programs. The student identified as being academically disadvantaged, for example, can be given the opportunity and supportive services to become an auto mechanic through the medium of a work-study program, if that outcome suits his individual abilities and interests. For information purposes in the planning process, target enrollments and completions should be listed as explicit numbers, distinguishing instructional programs and relating them to participating students by target type.

8. Reporting forms themselves can make it impossible for information coordinators at the state level to relate local data on one variable to another variable. Designers of forms for local data submissions should be careful to require the kind of information they need for state-level program management, such as the identification by type of students not succeeding in regular programs, and information on how they are assigned by instructional code categories to special programs such as work-study programs. Designers of forms should avoid the kind of column and row headings that split student information and program information, permitting you to tell separately the number of local disadvantaged by type and the number of enrollees in instructional program, but not the count of the disadvantaged within instructional programs.

APPENDIX II

ANNOTATED BIBLIOGRAPHY

An Act to Amend the Vocational Education Act of 1963, and for Other Purposes, U.S. Congress, Senate, H.R. 18366, 90th Congress, 2d Session, 1968.

As a major legislative milestone in vocational education, this Act seeks the improvement and strengthening of vocational education programs at all levels. The vocational education planner is thus shown through a series of new requirements and procedures, how to tailor his training programs more closely to needs of distinct groups in the population i.e. disadvantaged, handicapped and how to utilize manpower and demographic information in planning more flexible programs for state and local areas. In addition, provisions are made for professional growth and development of teaching and administrative personnel and the encouragement of exploratory programs and new teaching methods.

Kotz, Arnold, ed., Occupational Education: Planning and Programming, Stanford Research Institute, California, September 1967. Volumes I-IV.

Provides significant insights into planning and programming in vocational education by bringing the reader up to date on concepts and techniques followed by vocational education planners in state and local areas throughout the country. Papers on specific aspects of planning and decision-making presented by economists and administrators during a national conference on planning are also included, together with recommendations on which procedures within these aspects are particularly feasible for federal, state or local levels.

Lecht, Leonard A., Manpower Needs for National Goals in the 1970's, Frederick A. Praeger, Inc., New York, 1969.

Offers the concept of national goals analysis as a framework in which to relate the nation's resources to its aspirations. Proceeding upon the assumption that the United States will continue to pursue its current activities in sixteen definable goal areas, it demonstrates how the pursuit of these activities will correspondingly affect manpower requirements and employment opportunities in the 1970's. It shows the combined probable dollar costs and human resources requirements for each particular goal, indicating that not all goals may be implemented at the same time and that planning on the basis of set priorities is vital. Its importance to the planner therefore lies in the guidelines it provides for setting national priorities in program planning, showing what goals when pursued are high employment growth areas.

Methods and Strategies for State Plan Development in Accordance with the Provisions of Vocational Education Amendments of 1968. A Summary Paper Presented at the National Conference on State Plans Sponsored by the U.S. Office of Education, Covington, Kentucky, March 24-27, 1968.

This report summmarizes the proceedings of a national conference held

on the development of state plans. It analyzes the implications of the 1968 Vocational Education Act Amendments for educational planning with appropriate comments given on state plan guides and planning procedures followed by various states. Short discussions of delegates' reactions to the five working papers dealing with all aspects of program planning and evaluation are also included.

Occupational Outlook Handbook, 1968-1969, U.S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 1450, Washington, D.C. 1968.

Describes all types of occupations in the United States according to their education, health or skill requirements, duties and responsibilities and current employment trends. This information is geared to the use of individuals interested in the relationship between labor market trends and training opportunities, i.e. guidance counselors and educational planners. Estimates of projected job openings are generally provided for the 1970's.

A companion periodical, the Occupational Outlook Quarterly, updates career information presented in the biennial Handbook, and offers a wealth of articles on current developments and changes affecting occupations. A second related publication, the Occupational Outlook Report Series makes available Handbook information on specific career fields in brief reprints.

Priorities in Vocational-Technical Education and National Goals in the 1970's, National Planning Association, Washington, D.C., 1970, Volume I and II(Reports I-VI).

This report is one of continuing research efforts in the study of national goals and the manpower requirements needed to achieve them in the 1970's. Implications for vocational education have been drawn from a close assessment of how the vigorous pursuit of specific goals may affect manpower requirements in related occupations and the type of training needed to prepare individuals for these occupations. Six additional reports, available separately, attempt to measure in greater detail the impact of assigning a high priority to specific goals,for example, health, education and social welfare, upon related occupational employment. Consequently priorities for planning and programming in vocational-technical education have been set within these goal areas. These reports are: (1) Career Openings in Health Occupations; (2) Nonprofessional Occupations in Education, (3) Career Openings in Social Welfare; (4) Career Opportunities in the Construction Crafts; (5) Job Opportunities in Transportation; (6) Education for Technician Careers.

"Social and Manpower Environments of Vocational Education," General Report of of the Advisory Council on Vocational Education, 1968, Office of Education, U.S. Department of Health, Education and Welfare, Ch. 11, pp. 163-182.

Identifies current socio-economic issues and forces of change within the labor force as they relate to vocation education and presents new dimensions for manpower training in the light of their implications. It emphasizes the need for a more systematic aaproach that would coordinate vocational education programs in all levels of training such as general education, vocational education, manpower development, adult education, and on-the-job training, where vocational education increasingly assumes a major role in skill development. A special section is devoted to an analysis of federal manpower policies and programs in the 1960's and develops a design which incorporates given alternative approaches to the problem of coordinating federal, state and local effort in manpower training.

Venn, Grant, "The Vocational Education Amendments of 1968," American Education, December 1968-January 1969.

Briefly and concisely delineates the importance of the 1968 Vocational Amendments and explains its new directions as an aid to planning stronger, more flexible vocational education programs, stressing that these programs are now designed for individuals and groups instead of occupational groupings. A summary of the highlights of the Act, Title I and II, including salient provisions and requirements of each section, follows the analysis.